NOTES

ON THE

NEWER REMEDIES

Their Therapeutic Applications and Modes of Administration

BY

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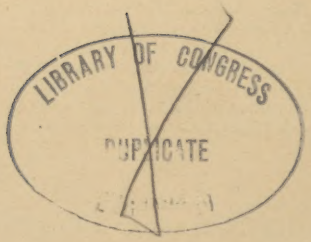

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TO

HORATIO C. WOOD, M. D., LL.D.,

OF PHILADELPHIA.

My Dear Doctor Wood:

None can be more sensible than myself of the defects of this little volume, and perhaps I will do you no credit by attaching to it your great and honored name; yet I have not been able to resist the temptation of dedicating this brochure to you. Pardon the liberty I have taken in so doing, and please accept my dedication as a token of much respect and admiration from the humblest of your pupils and friends.

DAVID CERNA.

Galveston, Texas, 1892.

PREFACE TO THE SECOND EDITION.

THIS little work has been thoroughly revised, and many of its articles entirely rewritten. An attempt has been made to bring it up to date. The paragraphs on *physiological action* and *toxicology*, and in fewer instances those on *incompatibility* and *contraindications* (constituting a new feature in the present edition), have been prepared in connection with the more important and better-studied of the newer remedial agents. Not only the results of my original studies of some of the newer drugs (notably antipyrin, chloralamid, chloride of ethyl, hydrastine, iodol, kava-kava, pental, phenacetin, phenocoll, and sparteine), but also the most recent physiological and therapeutic data furnished by the researches of many eminent investigators, have been incorporated in this edition. Some of the articles which have been thought not to come strictly under the title of "newer remedies" have been omitted. A great deal of new matter, the largest portion of which will be found in the main body of the book, has been introduced in the endeavor to keep the work in touch with the more recent advances in modern therapeutics.

In like manner an "Index of Diseases" has been added, in the hope that it will prove useful to the general practitioner.

I wish to thank Dr. Seth M. Morris, professor of chemistry and toxicology in the medical department of the University of Texas, and Dr. Charles Milton Buchanan, professor of chemistry, toxicology, and metallurgy in the medical and dental departments of the National University, for having kindly corrected many of the errors contained in the chemical formulæ of a number of the new synthetic products—errors which were overlooked in the first edition of this brochure. To the profession in general and to the medical press I wish likewise to express my high appreciation for kind criticisms and many words of encouragement. My thanks are also due to the publisher, Mr. W. B. Saunders, for many courtesies extended.

DAVID CERNA.

GALVESTON, TEXAS, December, 1894.

PREFACE TO THE FIRST EDITION.

That I have not attempted to write a work on Therapeutics goes without saying. One of my objects in preparing these "Notes" is to keep brief records of the therapeutic applications of the newer remedies, especially of those whose usefulness has been more or less ascertained by clinical investigation.

The progress of pharmacology is so great that it is almost impossible for the standard works upon therapeutics to open their pages for the consideration of so many discoveries as are being constantly made in the use of new remedial agents. Modern pathology, which necessarily includes the wide province of bacteriology, has so revolutionized the world of scientific medicine, especially as regards the cause of disease, as to threaten a complete overthrow of every old system of therapeutics.

A new era has certainly been opened for the study of the cause of disease, and *pari passu* with the advance of pathology there is a similar progress in the study and application of new medicinal substances and measures, in all of which is seen the checkless spirit of investiga-

tion. It seems, indeed—nay, it is a fact—that no barrier can obstruct the tireless march of science.

The almost daily appearance of new works on pharmacology and therapeutics shows what the spirit of the age demands, and certainly the market cannot be too full of such books, if the immense amount of work that is being constantly done in the laboratory of scientific medicine and in the clinical ward be taken into consideration. The advance of pharmacology is such that the revised editions of works previously published, and even the new books upon the subject, become old as soon as they leave the printer's office.

Neither the student nor the general and busy practitioner, without neglecting other important matters, can possibly keep abreast of the times in regard to the science and art of modern therapeutics. Each would therefore, it seems to me, welcome a ready-reference vade-mecum. Let such consideration be my only excuse for the publication of this little memorandum. And let it likewise be understood that my chief aim in the preparation of this brochure has been to furnish the practitioner and the student, and in as brief a manner as possible, the most *salient points* concerning the employment of the newer drugs in the treatment of disease. Some of these medicaments, not yet fully studied therapeutically, receive merely a passing mention. I have, for this reason, omitted all discussion as

to how such remedies act physiologically—a subject in itself quite extensive. As it has been said somewhere (and the remarks are applicable to the present case), "Chemists are so multiplying compounds that if each compound is to be thoroughly studied by the physiologist the result would hardly be contained in the world's literature, and it is worth while . . . to carry these investigations far enough to determine the practical importance of new agents." For a similar reason I have advisedly omitted all bibliographical references.

Without following any classification, which is almost impossible to adopt in the present unsettled state of pharmacology, I have thought it best to arrange the matter in alphabetical order for the sake of convenience.

Special attention is given to the therapeutic applications of the newer remedies and the modes of their administration. Whenever it is possible, points are given in regard to the origin, physical properties, and solubility of the medicaments considered. Regarding weights and measures, both systems, the apothecaries' and the metric, are employed. It will be observed, as I have stated already, that brevity is a feature of these "Notes." I have tried to be brief, bearing in mind that in cases like the present real information, not verbiage, is most urgently demanded.

As will be observed by a careful perusal, comparatively few of the newer remedies are derived from the vegetable kingdom. The greater number of them are synthetic in character.

It is possible that many of these new drugs now in vogue and claimed to be of value as therapeutic agents will (as has been the fate of some already) on further trial be laid aside as worthless. This in mind, I shall endeavor to continue my work of review, and propose to revise this brochure as often as the progress of the new era of scientific therapeutics shall demand it.

In the mean time I shall be pleased to receive from the press, as well as from individuals interested in the matter, suggestions regarding the character of this compilation. In fact, suggestions are respectfully requested.

All just and unbiased criticism will be given due consideration, knowing, as I do, that my little work is at present anything but exhaustive. My "Notes" will perhaps be the groundwork for a larger volume, in which the physiological and therapeutic actions of the newer medicaments shall be not only touched upon, but also duly discussed.

DAVID CERNA.

GALVESTON, November, 1892.

NOTES

ON THE

NEWER REMEDIES.

ACETOPHENONE.

This drug is also known under the common name of *hypnone*, but technically it is the *phenylmethylketone*, having a formula of $C_6H_5COCH_3$.

Physical Properties.—Acetophenone is a colorless, volatile liquid with an odor resembling that of bitter almonds. It has a sp. gr. of 1.032, and solidifies at 57.2° F. (14° C.), from which it melts again at 68° F. (20.5° C.).

Solubility.—Acetophenone is soluble in alcohol, ether, chloroform, benzin, and oil of sweet almonds, and insoluble in water and glycerin.

Physiological Action.—Upon the lower animals *acetophenone* in moderate amounts does not produce deep sleep; it is said to exert a powerful local paralyzing influence. Toxic doses cause general muscular paralysis, coma, and death from failure of the respiration.

Therapeutic Applications.—Acetophenone is generally given in cases of insomnia without pain and in a variety of nervous disorders. This remedy has a tendency to produce a depressant action, and therefore it should be carefully watched.

Administration.—Acetophenone is usually administered in capsules with oil or in emulsion with syrup or peppermint-water, in single doses of from 1 to 5 minims (0.066 to 0.3 gramme).

ACET-TOLUIDE.

This recent antipyretic, also called *aceto-ortho-toluide*, is represented by the formula $C_7H_7.NH.C_2H_3O$.

Physical Properties.—*Acet-toluide* appears in the form of colorless needles having a melting-point of 224.6° F. (107° C.) and a boiling-point of 564.8° F. (296° C.).

Solubility.—Aceto-ortho-toluide is soluble in alcohol, ether, and hot water; less so in cold water.

Therapeutic Applications.—Resembling acetanilid and methyl-acetanilid in their action, acet-toluide is said to be a powerful antipyretic. While it reduces the temperature very decidedly, it is claimed to be less toxic than the other two remedies mentioned. This new antipyretic has been employed in febrile disorders with apparent satisfactory results, but the dosage has not been accurately determined.

ACONITINE.

An alkaloid principle extracted from the common aconite, or monk's-hood, *Aconitum napellus*.[1] According to the most recent investigations, the chemical composition of *aconitine*, also called *benzoylaconine*, is $C_{32}H_{43}NO_{11}$.

Solubility.—Most of the salts of aconitine are soluble in water.

Physiological Action.—Aconitine is a local anæsthetic.

Circulation.—This drug is a cardiac depressant, lowering the blood-pressure and the pulse by a direct action on the heart-muscle. Experimentally, it exercises no apparent vaso-motor influence. Poisonous amounts produce marked diminution of the pulse-rate, preceded sometimes by an increase as the result of heart-weak-

[1] Monk's-hood contains other principles, such as *aconine* ($C_{22}H_{35}NO_9$), *pseudaconine* ($C_{25}H_{41}NO_8$), *pseudaconitine* or *veratrylaconine* ($C_{36}H_{49}NO_{11}$), and *picraconitine* ($C_{25}H_{39}NO_{10}$). All these substances, however, have not been tried in practical medicine.

ness, and finally a diastolic arrest of the heart with loss of the muscular irritability of this organ.

Respiration.—Aconitine depresses the function of breathing, and in toxic doses paralyzes the respiratory centres.

Temperature.—This drug is said to lower the bodily temperature through the impaired circulation produced and the increased heat-dissipation.

Kidneys.—In the healthy economy the action of the drug is uncertain, but in fever it is said to cause an increase in the urinary secretion.

Therapeutic Applications.—The uses of the mother-drug are well known. The *nitrate of aconitine*, the salt most generally employed in medicine, has been used with asserted success in acute rheumatism, cephalalgia, and especially in trigeminal neuralgia. Great care, however, must be exercised in the administration of this highly-poisonous drug.

Administration.—*Aconitine nitrate* may be given in doses of $\frac{1}{250}$ of a grain (0.00025 gramme). Locally, an ointment of the strength of 2 grains to the drachm (0.13 in 3.75 grammes) may be employed. A 2 per cent. solution in oil of the *oleate of aconitine* has also been highly recommended as a local application in neuralgia.

Toxicology.—Among the earliest symptoms of poisoning by aconitine or its mother-drug are tingling of the throat and of the extremities. Then follow marked general relaxation; anæsthesia of surface; pulse slow, weak, intermittent; respiration shallow, slow, feeble; skin covered with cold sweat; countenance pale, anxious; protrusion of eyes; pupil generally dilated; diplopia; often loss of voice and sight; sometimes gastric burning and convulsions; bodily temperature lowered. Consciousness may be preserved. The drug causes death by cardiac paralysis.

Treatment of Poisoning.—Place the patient in a prone position and in *absolute* quiet, with the head lower than the feet. Endeavor to wash out the stomach, but *avoid*

emetics. Hypodermatic injections of ether, alcohol, ammonia, and especially of *digitalis*, may be employed. External heat is of service, and as a last resort artificial respiration should be employed.

ADONIDIN.

Adonidin is the glucoside of *Adonis vernalis*. Its chemical nature has not as yet been determined, but it is said to be free from nitrogen.[1]

Physiological Action.—*Circulation.*—Adonidin causes in mammals a rise of the arterial pressure accompanied with an increase in cardiac force. Toxic quantities produce in the frog diastolic arrest of the heart. The range of action of this drug shows a direct cardiac influence.

Therapeutic Applications.—This remedy is employed as a cardiac stimulant and diuretic. It is said to be valuable in the pains of heart disease, being especially indicated in aortic and mitral insufficiency.

Administration.—The daily dose of adonidin is from ¼ to ½ a grain (0.015 to 0.030 gramme).

ÆSCULIN.

This glucoside is obtained from the bark of the horse-chestnut, *Æsculus hippocastanum*. Its chemical composition is represented by the formula $C_{15}H_{26}O_9$.

Physical Properties.—Æsculin occurs in white, brilliant, acicular crystals.

Solubility.—This glucosidal remedy is soluble in hot water.

Therapeutic Applications.—Æsculin has been successfully employed in the treatment of malarial disease, especially remittent fever, as a substitute for quinine.

[1] Another principle, a glucoside which occurs in the form of an amorphous powder, has recently been obtained from *Adonis amurensis*, a Japanese plant. This new glucoside, called *adonin*, has a chemical composition represented by the formula $C_{20}H_{40}O_9$.

AGARICIN.

This substance is known under various other names, as agaric, agaricic, agaricinic, and laricic acid. It is obtained from the *Fungus laricis* or *Polyporus officinalis*, commonly called white alaric, touchwood, or punk. The formula of *agaricin* is $C_{16}H_{30}O_5 + H_2O$.

Physical Properties.—Agaricin is a white powder with a melting-point of 280.4° F. (138° C.).

Solubility.—This drug is only slightly soluble in water.

Physiological Action.—The action of this drug has not been accurately determined, but in acting as an antihidrotic it is asserted to influence the nerve-filaments of the sweat-glands.

Therapeutic Applications.—Agaricin has been used as an antihidrotic in the night-sweats of phthisis, but its value is somewhat uncertain.

Administration.—This remedy is best given at night, in pill form, in doses of from 1 to 2 grains (0.064 to 0.128 gramme) every five hours.

AGATHIN.

Agathin is the name of a new drug which chemically is the *salicyl-α-methyl-phenyl-hydrazone*, obtained by the interaction of salicylic aldehyde and α-methyl-phenyl-hydrazine. It is represented by the formula $C_6H_4(OH).CH = N.N(CH_3).C_6H_5$.

Physical Properties.—Agathin is a white-greenish crystalline substance, odorless and tasteless, with a melting point of 165.2° F. (74° C.).

Solubility.—This drug is soluble in alcohol and ether, but is insoluble in water.

Therapeutic Applications.—The principal action of agathin is that of an analgesic and antirheumatic. It has been tried with satisfactory results in the treatment of nervous disorders, especially in trigeminal neuralgia and in sciatica. Good effects have also been observed

from its use in articular rheumatism and other allied affections.

Administration.—The dose of agathin varies from 4 to 8 grains (0.26 to 0.52 gramme) three times a day.

ALANTHOL.

Alanthol is a liquid substance obtained from the root of the plant commonly known as "elecampane" (*Inula helenium*). The principle is also called *inulol*, and its chemical formula is $C_{20}H_{32}O$.

Physical Properties.—Alanthol has a peppermint-like odor and taste, and boils at 392° F. (200° C.).[1]

Therapeutic Applications.—Alanthol has not had a very extensive trial as a therapeutic agent, but it has been recommended as a substitute for the oil of turpentine in the treatment of tubercular diseases.

ALDEHYDE.

Aldehyde, or, better, acetic aldehyde, is alcohol deprived of two atoms of hydrogen, its formula being C_2H_4O.

Physical Properties.—Aldehyde is a colorless limpid liquid with a peculiar, characteristic ethereal odor. It is pungent, inflammable, and readily absorbs oxygen.

Therapeutic Applications.—This drug is employed in catarrhal congestion of the mucous membranes, and is claimed to be of especial value in ozæna. This remedy has also some anæsthetic properties.

Administration.—Aldehyde is best administered by inhalation from a solution of the strength of from 5 to 10 minims to the pint of hot water (0.3 to 0.6 in 512 grammes).

ALUMNOL.

This new salt of aluminum has received the common

[1] Alanthol is found in combination with *alanthic* or *inulic* acid ($C_{15}H_{20}O_2$), which occurs in the form of needles, and with *helenin* (C_6H_8O), an insipid body.

name of alumnol. It is said to be the salt of a sulphonated organic acid and to contain 15 per cent. of silver and 5 per cent. of aluminum.

Physical Properties.—This drug occurs as a white or reddish-white non-hygroscopic powder.

Solubility.—This remedy is readily soluble in water, glycerin, and warm alcohol.

Therapeutic Applications.—Alumnol has been found of great service in the treatment of gonorrhœa and endometritis gonorrhoica, in soft chancres, erosions, and balanitis. It is highly recommended in acute and chronic cutaneous inflammatory processes. As an antiseptic it is suggested in the treatment of middle-ear disease, being said to arrest suppuration and excretion and to promote the rapid healing of wounds.

Administration.—As a local remedy, as in gonorrhœa, alumnol may be administered in solution of the strength of 1 per cent. For endometritis it may be employed in the form of suppositories of the strength of from 2 to 5 per cent. For chronic diseases of the skin concentrated solutions of a strength varying from 10 to 50 per cent. are recommended. Alumnol plaster and varnish have been used in the latter cases with alleged good results.[1]

[1] *Aluminum boroformate* is spoken of as a disinfectant astringent. It occurs in pearl-like crystals which are very soluble in water. On account of its mild action, *boroformate of aluminum* is suggested for use in throat diseases of children, but so far no therapeutic data have been published. Two other salts of aluminum have recently been introduced: *salumin* and *tannal*, which are respectively the *aluminum salicylate* and the *aluminum tannate*. The salicylate of aluminum exerts an astringent and irritant action, and is recommended in the form of insufflations or in ammoniated solutions in the local treatment of pharyngitis and ozæna. The tannate of aluminum is also an astringent, and has been tried with advantage in the local treatment of laryngitis, pharyngitis, and catarrhal rhinitis, in the form of a spray or gargle or by insufflation. The double salt of *aluminum tanno-tartrate*, which is very soluble and non-irritant, is employed likewise as a substitute for the tannal, in the form of a gargle or spray from solutions in water or glycerin. *Gallal*, or the *gallate of aluminum*, may be used for similar purposes.

AMYLENEHYDRATE.

The technical name of this substance is *dimethylethylcarbinol*. It is a tertiary alcohol, and is represented by the formula $(CH_3)_2C_2H_5COH$, or $C_5H_{12}O$.

Physical Properties.—*Amylenehydrate* is a colorless thick liquid having a peculiar penetrating odor. It is hygroscopic, has a sp. gr. of 0.81, and when pure it boils at 216.2° F. (102.5° C.).

Solubility.—This drug is soluble in 8 parts of water at 59° F. (15° C.), the solution becoming turbid when warmed. It mixes with alcohol, ether, and chloroform.

Physiological Action.—*Nervous System.*—Upon the lower animals small quantities of amylenehydrate cause deep sleep without disturbing the circulation or the respiration. Large or toxic amounts are said to paralyze the medulla oblongata.

Metabolism.—Unlike chloral, the drug under consideration diminishes tissue-waste.

Therapeutic Applications.—Amylenehydrate is a valuable hypnotic, standing, in its effects, midway between chloral and paraldehyde, and it is usually free from the unpleasant effects often produced by the latter two drugs. This remedy is employed in insomnias not due to pain, and especially in those resulting from the withdrawal of other narcotics previously used. It is likewise valuable in whooping-cough of children. The sleep produced by amylenehydrate is quiet and refreshing. As a hypnotic, judging from its action on metabolism, it is to be preferred to other similar remedies, especially in those diseases that are accompanied by great nitrogenous waste.

Administration.—This remedy is given in single doses of from 1 to 2 drachms (4 to 8 grammes), in capsules by the mouth or by the rectum. For children the quantity of this drug employed should not exceed 3 or 4 minims (0.018 to 0.025 gramme).

Toxicology.—Amylenehydrate in large doses is capable of producing a very deep narcosis accompanied with general muscular paralysis, loss of reflexes, dilated pupils, a small, slow pulse, an irregular, slow, and deep respiration, and diminished bodily temperature. In cases of poisoning by this drug general stimulation should be applied, and, if necessary, artificial respiration.

ANALGEN.

Analgen, which has recently been introduced into practical medicine, is a derivative of chinolin. It is the *ortho-oxyethyl-anamo-acetyl-amido-chinolin*, and is represented by the formula $C_{26}H_{14}N_2O_4$.

Physical Properties.—Analgen occurs in the form of a white powder having a bitter taste. It has a melting-point of 311° F. (155° C.).

Solubility.—This new agent is readily soluble in hot water, in alcohol, and in the dilute acids. It is almost insoluble in cold water.

Physiological Action.—Analgen is dissolved by the gastric juice, and appears in the urine in from a half to one hour after its ingestion. It is broken up in the stomach into *acetic acid* and *ortho-oxyethyl-ana-amido-chinolin*, the presence of the latter body in the urine being shown by a reddish tint. A hypodermatic injection of 15 grains (1 gramme) of the *sulphate of analgen* has produced convulsions in guinea-pigs. Doses of 45 grains (3 grammes) a day produced no urinary symptoms in dogs.

Therapeutic Applications.—This new remedy has been found to possess valuable antipyretic and analgesic properties. It is said to be of service in the treatment of rheumatism.

Administration.—This drug may be given in doses of 15 grains (1 gramme).

ANEMONINE.

Anemonine is the alkaloid principle of *Anemone*

pulsatilla. Its chemical composition is put down as $C_{15}H_{12}O_6$.

Physical Properties.—This alkaloid occurs in colorless crystalline needles having a melting-point of 304.6° F. (152° C.).

Solubility.—Anemonine is readily soluble in warm alcohol, but insoluble in water and ether.

Therapeutic Applications.—This remedy has been employed with apparent success in painful affections of the female pelvic organs, such as dysmenorrhœa, perimetritis, ovariosalpingitis, and others.

Administration.—This alkaloid is given in doses of from $\frac{1}{12}$ to $\frac{2}{7}$ of a grain (0.05 to 0.20 gramme).

ANISIC ACID.

By oxidation of *anethol* ($C_{10}H_{12}O$), a constituent of anise and fennel oils, there is obtained *anisic acid*, known as *methyl-para-oxybenzoic acid*, an isomer of methyl-salicylic acid. The chemical composition of anisic acid is $C_6H_4(OCH_3)COOH$.

Physical Properties.—Anisic acid appears in the form of colorless prisms having a melting-point of 356° F. (180° C.).

Solubility.—This acid is freely soluble in hot and cold alcohol, but insoluble in water.

Therapeutic Applications.—This drug possesses antiseptic and antipyretic properties; hence it has been used in the treatment of wounds and in that of acute articular rheumatism. Its effects have been satisfactory.

Administration.—Anisic acid is seldom given by itself. The *sodium salt* is the preparation generally employed, in doses of 15 grains (1 gramme).

ANNIDALIN.

This substance must not be confounded with aristol, also known under the same name of annidalin. The agent under consideration is the *dithymol triiodide*.

Physical Properties.—*Annidalin* occurs as a reddish-

brown powder which is decomposed by heat and light with the evolution of iodine.

Solubility.—This drug is readily soluble in chloroform and ether, slightly so in alcohol, but is insoluble in water.

Therapeutic Applications.—Annidalin is usually applied locally as a substitute for iodoform and aristol in those diseases for which these two remedies are employed.

Administration.—This drug is used in the pure powder or in the strength of 10 per cent.

ANTHRAROBIN.

A substance obtained from *alizarin*, the crystalline principle of *Rubia tinctorium*, or the common madder. *Anthrarobin* is also called *desoxyalizarin*. It is a derivative of phenol and allied to chrysophanic acid. Its formula is $C_6H_4\begin{matrix}C(OH)\\CH\end{matrix}>C_6H_2(OH)_2$.

Physical Properties.—Anthrarobin is a yellowish powder. A solution of it exhibits a brown color changing to a green and finally to a violet one, these changes being due to the amount of oxygen taken up.

Solubility.—This drug is readily soluble in alcohol, glycerin, or in dilute alkaline solutions; sparingly so in ether and chloroform; insoluble in water or in acids.

Therapeutic Applications.—The chief use of anthrarobin is in skin diseases, and it has been of service especially in psoriasis, pityriasis versicolor, and herpes.

Administration.—This remedy is applied locally in the form of ointment of the strength of not more than 20 grains to the ounce (1.3 : 30 grammes).

ANTICYLIC ACID.

Under the name of *anticylic acid* there is found upon the market a white fragrant powder with a refreshing acid taste.

Solubility.—Anticylic acid is readily soluble in water, alcohol, and glycerin.

Therapeutic Applications.—This remedy is said to be antipyretic, and has been found of service in pneumonia, enteric fever, and acute articular rheumatism.

Administration.—The dose of anticylic acid is set down as $\frac{1}{100}$ of a grain (0.0006 gramme).

ANTIFEBRIN.

The proper term for this drug is *acetanilid* or *phenyl-acetamid*, antifebrin being its original patent name. It is an anilin in which one atom of hydrogen has been replaced by the radical acetyl. Its chemical composition is $C_6H_5NHC_2H_3O$, or C_8H_9NO.

Physical Properties.—Antifebrin is a colorless and tasteless crystalline substance, and when pure it occurs in brilliant rhombic tables. The crystals melt at 235° F. (112.8° C.) and boil at 557.6° F. (292° C.). It is broken up into its original compounds by the prolonged action of hydrochloric acid.

Solubility.—Antifebrin is readily soluble in ether and chloroform; in cold alcohol in the proportion of 1 part to 3½ parts; freely in boiling alcohol; and also in benzene and alcoholic liquors. It is insoluble in water at ordinary temperatures.

Physiological Action.—*Circulation.*—Moderate amounts of this drug produce no changes in the circulation. The blood is considerably altered under large doses: it becomes brownish red, its ozonizing power is diminished, its alkalinity decreased, and finally its hæmoglobin is changed into methæmoglobin. Accompanying this phenomenon there is a destruction of the corpuscular elements. The heart, though apparently stimulated at first, is depressed, especially by large doses, and is finally arrested in diastole. The action on the pulse is irregular, although it is generally depressed also. Small quantities increase, and large quantities lower, arterial

pressure, the action being of a cardiac and vaso-motor origin.

Respiration.—Medicinal quantities produce no effect on this function. Large, and especially poisonous, amounts cause the respiration to become at first accelerated, then markedly decreased and difficult. These results are the outcome of an action primarily on the blood itself and secondarily on the respiratory centres. Death is due chiefly to failure of the respiration.

Nervous System.—Antifebrin causes a short period of excitement followed by general anæsthesia and analgesia. Poisonous doses produce paralysis of the peripheral motor nerves, although the drug probably first affects the sensory side of the cord and finally the motor apparatus. Reflex action is completely abolished from interference with motor and sensory impulses. These phenomena are followed by coma and death.

Temperature.—Antifebrin is able to produce lowering of the normal bodily temperature, causing, in poisonous amounts, collapse accompanied with more or less pronounced rigors and sweating, The drug is a powerful antipyretic, reducing fever by increasing heat-dissipation and diminishing heat-production.

Metabolism —This drug apparently increases the excretion of urea and that of uric acid.

Urine and Elimination.—Antifebrin in large doses produces a dark urine, which is said to be due to the presence of broken-down coloring matter of the blood. This drug is eliminated through the kidneys in the form of paramido-phenol sulphate.

Therapeutic Applications.—This drug has been advantageously employed chiefly as an antipyretic in fevers, and in phthisis and pulmonary diseases generally. It is most suitable in sthenic fevers. In fevers of the asthenic type, as well as in all pulmonary disorders, the use of antifebrin is exceedingly dangerous, if not unwarrantable. It is in these latter instances that the remedy is apt to produce collapse *pari passu* with the

reduction of the abnormal temperature. On account of its decided action on the blood, the use of the drug is contraindicated in anæmic individuals. The power of antifebrin as a sedative and an analgesic is quite marked; hence its usefulness in mania, epilepsy, ataxia, sciatica, whooping-cough, migraine, and chorea. This agent has given great relief in the laryngeal spasms of tabetic patients. As a hæmostatic it has rendered good service in epistaxis and hæmoptysis, and as an antiarthritic in rheumatic affections. It has also been recommended as a local antiseptic, as an excellent application in obstinate ulcers, and similarly in the treatment of skin diseases, such as psoriasis, eczema, erysipelas, urticaria, etc.

Administration.—Antifebrin is given to adults in doses of from 5 to 10 grains (0.3 to 0.6 gramme), or as high as 30 grains (2 grammes) in the course of the day. It is best administered in capsules or wafers, or, especially in the case of children, in mucilage of acacia. As a local remedy, an ointment with vaseline in the strength of 20 grains to the ounce (1.3 in 30 grammes) may be employed, either by itself or as an adjunct to mercurial preparations.

Toxicology.—Though death has rarely been produced by antifebrin, even when administered in comparatively large amounts, yet this agent is apt to cause alarming symptoms. Among the untoward effects produced by antifebrin may be mentioned hallucinations in weak constitutions, delirium, dizziness, pain over the stomach, diarrhœa, hæmorrhages, palpitation, profuse sweating, rigors, marked cyanosis, muscular twitchings, rigidity, and clonic convulsions. In acute poisoning a slow, compressible pulse, a shallow respiration, cyanosis, and profuse sweating are the chief symptoms noticed. The prolonged use of the drug may give rise to congestion of the various organs and to the formation of heart-clots. No exanthematous rash has been observed from the action of antifebrin. In cases of acute poisoning by this drug cardiac and respiratory stimulation by digitalis

and strychnine, external heat, and inhalations of oxygen should be resorted to.

ANTIHYDROPIN.

Antihydropin, a crystalline body whose chemical nature has not been determined as yet, is thought to be the active principle of *Blatta orientalis*, or the common cockroach.

Therapeutic Applications.—This new agent has been chiefly used as a diuretic in dropsical affections.

Administration.—The daily dose of antihydropin is from 10 to 20 grains (0.6 to 1.3 grammes).

ANTINERVIN.

This drug, also known as *salicyl-bromanilid*, is composed of salicylanilid and bromo-acetanilid. It is really a mixture of 1 part each of bromide of ammonium and salicylic acid and 2 parts of antifebrin or acetanilid. It is also termed *salbromalid*.

Therapeutic Applications.—*Antinervin* has been recommended as an anodyne, especially in cases of neuralgia, when phenacetin and antipyrin fail to do any good.

Administration.—The dose of antinervin is given as 15 grains (1 gramme).

ANTIPYRIN.

The scientific name of this drug is *dimethyloxyquinizin*, *phenyldimethylpyrazolon*, or *dehydrodimethylphenylpyrazin*. It has similarly been called *analgesin*, *methozin*, and *phenazon*. Antipyrin is a derivative of coal-tar, its chemical composition being $C_6H_5N\begin{cases} N(CH_3) \text{——} CO \\ C \text{——} CH(CH_3) \end{cases}$ or $C_{11}H_{12}N_2O$. It can also be prepared synthetically.

Physical Properties.—Antipyrin is a reddish-white

crystalline powder, odorless, and of a somewhat bitter taste, having a melting-point of 235.4° F. (113° C.). This drug can be differentiated from other organic substances by its characteristic reaction with the perchloride of iron. With the latter body antipyrin gives a dark-red coloration. With nitrous acid or the nitrates it exhibits an emerald-green color with the formation of isonitroso-antipyrin, and with nitric acid a yellow hue is produced, this latter color turning to crimson on the application of heat.

Solubility.—Antipyrin is readily soluble in water, rectified spirit, and chloroform, and in ether in the proportion of 1 part to 50 parts.

Incompatibility.—Antipyrin is incompatible with quite a number of substances. It is precipitated from an aqueous solution by the following: carbolic acid, the chlorides of mercury, cinchona-bark, infusion of catechu, tannin, uva ursi, and the tinctures of hamamelis, iodine, kino, and rhubarb. This drug is also incompatible with nitrous compounds, especially sweet spirit of nitre, calomel (with which a poisonous compound is formed), beta-naphthol, chloral, bicarbonate of sodium, the salts of quinine, and caffeine.

Physiological Action.—*Nervous System.*—In the lower animals small doses cause excitation of the brain, medulla oblongata, and spinal cord, accompanied with an increase of reflex action. Severe epileptiform and tetanic convulsions are soon afterward developed, but consciousness remains intact. The convulsions are chiefly of cerebral origin. These symptoms are succeeded by those of paralysis, especially under large quantities of the drug, followed by a total loss of reflex action. The latter phenomena are the result mainly of an action of antipyrin on the spinal receptive centres and on both the sensory and motor nerve-trunks. The action on the sensory nerves appears to be more pronounced than that on the motor fibres.

Muscular System.—Large amounts of antipyrin pro-

duce rigidity of the muscles, due to a direct action on the muscular fibre. The irritability of the muscles is ultimately diminished, and even destroyed, especially when the drug is applied locally.

Circulation: The Blood.—Therapeutic doses of antipyrin exercise no action upon this tissue. This drug is a hæmostatic, hence it is said to be more powerful than the salts of iron or even of ergotin. Large, and particularly toxic, amounts of antipyrin cause a chocolate color of the blood (cyanosis), owing to an alteration of the hæmoglobin into methæmoglobin. Besides this transformation antipyrin causes a diminution of the respiratory capacity of the blood, and even destruction of the corpuscular elements. It is said that these alterations bear some relation to the period and extent of the antipyretic action, and that the fixation of oxygen by the hæmoglobin is only produced by doses which cause a depression of the temperature amounting to 1°, 2°, and 3° C.

Blood-pressure.—Small and moderate amounts of antipyrin produce a rise of the arterial pressure from a direct cardiac action. Large and toxic quantities cause a decided fall of the pressure, due to a direct depressant action upon the heart itself. The vaso-motor system is apparently not influenced by the drug.

The Pulse.—This remedy causes an increase of the pulse-rate through paralysis of the cardio-inhibitory centres, followed by a diminution in the number of pulsations, this phenomenon being dependent upon a depressant action of the drug on the heart itself.

Respiration.—Moderate doses of antipyrin produce an increase in the number of respiratory movements, owing to a direct action on the centres of the medulla oblongata. Ultimately the rate of respiration becomes depressed, and by failure of this function death often is caused.

Temperature.—Antipyrin in therapeutic amounts exercises no action on the normal heat-functions. In fever,

however, the drug causes a decided fall of the bodily temperature, this reduction being due to a great increase in heat-dissipation together with a fall of heat-production. This phenomenon is effected chiefly through a thermotaxic mechanism.

Metabolism.—The drug diminishes the amount of urine excreted, this fluid remaining normal, but exhibiting a darkish color. At the same time this remedy causes a diminution in the elimination of the products of nitrogenous tissue-metamorphosis. It is said to increase also the amount of sulphuric acid in the urine.

Elimination.—This drug is rapidly eliminated by the urine, in which this remedy may be detected in from three to four hours after its ingestion by the stomach. It is claimed that this agent is likewise partly eliminated by the saliva.

Digestive Tract.—Moderate amounts of antipyrin exercise no influence either on the secretion of the gastric juice or upon the mechanism of digestion. Antipyrin often produces vomiting, this action being of centric origin.

Antiseptic Action.—Antipyrin, even in small doses, appears to exercise an antiseptic influence. In large amounts this medicament not only delays fermentation, but it likewise stops the development of, and even destroys, lower organisms.

Therapeutic Applications.—Antipyrin has been, and is, used in so large a variety of diseases with alleged success that it seems as if this agent were regarded as a panacea. The remedy is distinctly valuable as a general antipyretic and analgesic. It has rendered good service in acute fevers like typhoid and typhus, in acute rheumatism, in erysipelas, and in tubercular diseases. This drug has been employed with apparently good results in malarial fever, especially when the hyperpyrexia is persistent, and even in pneumonia. In these instances, however, and particularly in asthenic fevers and in pneumonia, this remedy is to be given with extreme caution

on account of its action on the blood and its depressant effect upon the general circulation, especially the heart. It is claimed that antipyrin is essentially useful in all forms of neuralgia, and to a considerable extent in epilepsy. It has also been recommended in chorea, tetanus, whooping-cough, migraine, locomotor ataxia, hemicrania, and sciatica. The good effects produced in these nervous disorders is unquestioned, but here, again, the medicament as a nervine or analgesic should be administered only to individuals whose blood is more or less in good condition. Antipyrin has been serviceable in incontinence of urine, uterine cancer, dysmenorrhœa, and the pains of labor. It has also proved beneficial in exophthalmic goitre, nocturnal pollutions, pains of tubercular meningitis, asthma (essential or of cardiac origin), angina pectoris, distress of aortic aneurism, diabetes mellitus, cerebro-spinal meningitis, sunstroke, and infantile diarrhœas. Combined with cocaine, antipyrin has relieved obstinate vomiting. Similarly, good is said to have been produced by the drug in skin diseases, such as urticaria, erythema nodosum, senile pruritus, prurigo, eczema, and others. Locally applied, antipyrin has been of service as an analgesic in nasal and throat troubles, and as a hæmostatic in hemorrhages. In the same way it has been used with excellent results in simple and granular conjunctivitis, dacryocystitis, episcleritis, scleritis, and chronic glaucoma. It has similarly rendered great service in purulent otitis and in cystitis with ammoniacal urine.

Contraindications.—Aside from cases of blood disorders, such as anæmia, chlorosis, etc., the use of the drug appears to be contraindicated in cardiac affections, in diphtheritic disease accompanied with myocarditis, in inflammatory affections of the lungs such as croupous pneumonia, in advanced tubercular cases, and in exhaustion from hemorrhages.

Toxicology.—Owing to individual idiosyncrasies antipyrin often causes untoward effects. Among these

may be mentioned nausea and vomiting and a peculiar erythematous eruption which may resemble measles, scarlatina, urticaria, or pemphigus. The rash is frequently accompanied with a troublesome pruritus, facial œdema, coryza, laryngitis, and catarrhal conjunctivitis. The eruption usually lasts from three to seven days or longer, appearing about the extremities and trunk and finally extending all over the body. The appearance of bullæ has also been noticed. Nervous symptoms, such as languor, giddiness, somnolence, and coma which may pass into deep stertorous unconsciousness, are produced; at other times cerebral excitement, tremblings, and hysterical manifestations are noticed. A cyanotic condition of the hands, face, nose, and lips, accompanied with cold extremities and a weak, rapid pulse, is often seen. Tingling sensations, profuse sweating, and collapse are also symptoms frequently observed. All these untoward effects appear to be more frequent in women than in men, in adults than in young subjects, and are generally produced by moderate doses of antipyrin. In *chronic poisoning* resulting from prolonged use of the drug there have been observed after death marked congestion of the brain and membranes with exudation into the ventricles, inflammation of the kidneys, contraction of the spleen, congestion of the lungs, and disintegration of the corpuscular elements of the blood. In *acute* poisoning by antipyrin general stimulation should be resorted to with the external application of heat. The administration of digitalis, strychnine, and caffeine is indicated, and inhalations of oxygen may be tried for the relief of the cyanosis.

Administration.—Antipyrin may be given in single amounts of from 5 to 30 grains (0.3 to 2 grammes) for adults. For children 3 grains (0.19 gramme) at a dose, once or twice daily, are sufficient, administered in peppermint-water or in syrup of orange-peel to disguise the taste of the drug. This remedy can also be employed hypodermatically. As a local application—as in hemor-

rhage, for instance—the powder itself or solutions of the strength of from 40 to 50 per cent. may be used; in this manner it causes no irritation. In the ocular diseases mentioned 2 per cent. solutions have been employed; in chronic glaucoma 25 per cent. solutions are recommended. In otitis 20 per cent., and in cystitis 4 per cent., solutions have been found of marked service.[1]

ANTISEPSIN.

The common name of *antisepsin*, also called *asepsin*, is given to the *mono-* or *paramono-brom-phenyl-acet-amid* or *paramono-brom-acet-anilid*. Its chemical formula is $C_6H_4BrNHC_2H_3O$.

Physical Properties.—This drug occurs in odorless and tasteless crystals with a melting-point of 328° F. (164.4° C.).

Solubility.—This remedy is readily soluble in alcohol and ether, slightly soluble in glycerin, but insoluble in water.

Physiological Action.—Small doses of antisepsin cause in the lower animals a fall of the temperature accompanied with diuresis and increased peristalsis. Tremors are often also produced. The drug dilates the pupils. Toxic amounts of antisepsin produce a decided mydriasis, great reduction of the bodily temperature, and spasms. There occur also a diminution of the pulse-rate, and disturbances of the respiration accompanied with glycosuria and hæmoglobinuria. Death is caused by respiratory failure.

Therapeutic Applications.—Antisepsin is employed as an antipyretic, analgesic, and antiseptic. It has given satisfactory results in cases of typhoid fever, pneumonia, and phthisis. It has acted favorably in neuralgias. As

[1] To a combination in definite proportions of antipyrin, citric acid, and caffeine, the name of *migrainin* has been applied. It is an *antipyrin-caffeine citrate*, and contains 9 per cent. of caffeine. Migrainin is alleged to be of value in the treatment of severe cases of migraine. It is given dissolved in water, in single doses of 15 grains (1 gramme).

a local application it has been used with alleged success in wounds and in the treatment of piles.

Administration.—The dose of this drug is ½ to 1 grain (0.03 to 0.06 gramme) three times a day.

Toxicology.—The untoward symptom most apt to follow the administration of antisepsin, especially after large doses, is cyanosis.

ANTISEPTIN.

This substance is known also under the name of *zinc boro-thymo-iodide*. It is a mixture composed of about 80 parts of the sulphate of zinc, 2 parts of thymol, and 10 parts of boracic acid. *Antiseptin* must not be confounded with *antisepsin* or with *antiseptol*.

Therapeutic Applications.—Antiseptin is chiefly used as an antiseptic.

ANTISEPTOL.

The *iodo-sulphate of cinchonine* is designated by the above name.

Physical Properties.—*Antiseptol* appears as a reddish-brown powder.

Solubility.—This remedy is soluble in water, alcohol, and chloroform.

Therapeutic Applications.—This drug is mainly employed as a substitute for iodoform.

ANTISPASMIN.

The name *antispasmin* is given to a combination of narcein-sodium and the salicylate of sodium. It is said to contain about 50 per cent. of pure narcein, and that chemically it is made up of 1 molecule of narcein-sodium and 3 molecules of the sodium salicylate.

Physical Properties.—Antispasmin occurs in the form of a whitish, slightly hygroscopic powder, and should therefore be protected from exposure to air and moisture.

Solubility.—This drug is readily soluble in water, forming a faintly-yellowish solution.

Physiological Action.—Antispasmin in doses of from $\frac{1}{6}$ of a grain to 1½ grains (0.01 to 0.10 gramme) is said to produce a marked narcotic effect. It causes fatal effects in rabbits in quantities of 7½ grains (0.5 gramme) per kilo of the body-weight.

Therapeutic Applications.—This new combination has been found effective as an excellent sedative and hypnotic, and is particularly indicated in spasmodic affections associated with pains. Thus, it has been found useful in convulsive cough, stridulous laryngitis, and whooping-cough. In the latter disorder this remedy is asserted to act on the branches of the superior laryngeal nerve, diminishing in this manner the reflex excitation of the larynx.

Administration.—Antispasmin is best administered in solution in sweetened water. The dose is put down as from $\frac{1}{6}$ of a grain to 1½ grains (0.01 to 0.10 gramme), and even as high as 3 grains (0.20 gramme).

ANTITHERMIN.

The chemical name of this drug is *phenyl-hydrazin-levulinic acid*, it being a substance allied to antipyrin. It is obtained by the interaction of phenylhydrazin and acetopropionic acid, and is represented by the formula $C_6H_5N_2HC\text{-}(CH_3)\text{-}CH_2COOH$.

Physical Properties.—This remedy occurs in colorless crystals which melt at about 226° F. (108° C.).

Solubility.—This drug is soluble in hot alcohol and in ether, but is insoluble in water.

Physiological Action.—It is affirmed that *antithermin* intravenously injected into the lower animals causes a diminution in the rate of the pulse, the arterial pressure remaining unaltered. The drug reduces the bodily temperature, and there occurs a decrease both of heat-production and heat-distribution.

Therapeutic Applications.—Antithermin is used as an antipyretic in those febrile affections for which anti-

pyrin is employed, but its power is apparently weaker than that of the latter remedy.

Administration.—The dose of antithermin is about 5 grains (0.3 gramme), and it is best administered in alcoholic solutions or in wafers.

Toxicology.—This drug is apt to cause untoward effects such as heaviness in the head, pallor of the face, and perspiration. Its ingestion, especially in debilitated individuals, should be made with caution.

APIOL.

This body is contained, in combination with other substances, in the fruit of the common parsley, *Petroselinum sativum* or *Carum petroselinum*. Its formula is $C_{12}H_{14}O_4$.

Physical Properties.—This drug occurs in long white needles with a faint parsley odor. It melts at 86° F. (30° C.) and boils at 561.2° F. (294° C.); its sp. gr. is 1.015.

Solubility.—*Apiol* dissolves readily in alcohol and ether, but is insoluble in water.

Therapeutic Applications.—This remedy has been used with apparent success in the treatment of dysmenorrhœa, and is also said to have given good results as an antiperiodic against malarial disorders.

Administration.—Apiol (this substance must not be confounded with the alcoholic liquid extract obtained from parsley-seeds) may be given in doses of from 10 to 15 grains (0.65 to 1 gramme), and it is best administered in capsules.

Toxicology.—Large doses of apiol are said to cause intoxication with ringing in the ears and severe frontal headache.

APOCODEINE.

This drug is said to be prepared in the same manner as apomorphine. The salt of *apocodeine* generally used

is the hydrochlorate, the chemical composition of which is $C_{18}H_{19}NO_2,HCl$.

Physical Properties.—*Apocodeine hydrochlorate* occurs as an amorphous powder.

Physiological Action.—This drug is pre-eminently a somnifacient. The sleep produced by it is not preceded by excitement, but is not as profound as that caused by morphine. Like codeine, apocodeine is able to produce an increase of the reflexes, and sometimes convulsions and tetanic spasms which may mask its cerebral action. In therapeutic doses, however, it is a nervine, acting primarily upon the brain, and modifying sensibility and the conductivity of the nerves. The drug is rapidly eliminated, and the return to consciousness is effected without untoward effects.

Therapeutic Applications.—Apocodeine is at present employed for its alleged expectorant properties. It is claimed to be of special value in chronic bronchitis.

Administration.—The dose of this salt is 3 to 4 grains (0.2 to 0.25 gramme), and it is best administered in pill form. The remedy may also be given subcutaneously in solutions of the strength of 2 per cent.

ARBUTIN.

The glucoside of the common bearberry (*Arctostaphylos uva-ursi*), its chemical formula being $(C_{12}H_{16}O_7)_2.H_2O$.

Physical Properties.—*Arbutin* appears in long, colorless, brilliant needles having a melting-point of 338° F. (170° C.).

Solubility.—Arbutin is soluble in cold water in the proportion of 1 part to 8; in alcohol in 1 to 16 parts.

Therapeutic Applications.—This glucoside is employed in diseases of the urinary tract as one of the most valuable of antiseptics, its effects being due to the *hydrochinone* which is set free in the organism.

Administration.—The dose of arbutin is 75 grains (5 grammes) per day, in divided amounts.

ARISTOL.

Aristol is the *dithymol-diiodide*, also commonly called "annidalin," but it must not be confounded with the latter substance, which is the *dithymol-triiodide*. Aristol is a substitution-compound from two molecules of thymol ($C_{10}H_{13}HO$) in which the two radicals of hydroxyl (HO) have been replaced by two iodoxyl radicals (IO). It is chemically represented by the formula $\begin{matrix} C_3H_7 \\ CH_3 \end{matrix}\!\!>\!C_6H_2(OI)\text{-}C\text{-}C(OI)H_2C_6\!<\!\begin{matrix} C_3H_7 \\ CH_3 \end{matrix}$.

Physical Properties.—Aristol is a reddish-brown powder, odorless or of a somewhat aromatic odor. It contains 45.80 per cent. of iodine.

Solubility.—This remedy readily dissolves in ether, collodion, and traumaticin; it is slightly soluble in chloroform, but is insoluble in water and glycerin.

Physiological Action.—It is asserted that even in very large quantities aristol exercises no deleterious influence on the lower animals. Its antiseptic power is also very feeble. How the drug is eliminated has not been determined.

Therapeutic Applications.—Aristol has been employed with success in cutaneous affections and syphilitic lesions, as a substitute for iodoform. It is especially valuable as a cicatrizant in the ulcers of tertiary syphilis, and good has been obtained from its use in lupus and psoriasis. It has been found highly serviceable, locally applied, in the treatment of interstitial keratitis.

Administration.—This drug is generally employed as a dusting-powder or in the form of an ointment of a strength varying from ½ to 1 drachm (1.95 to 3.9 grammes) to the ounce (31.10 grammes) of vaseline.

ASAPROL.

This substance, recently introduced into the market and into practical medicine, occurs in acicular crystals.

It is the *calcium-β-naphthol-α-mono-sulphonate*, with a formula of $(CH.C_{10}H_6SO_3)_2CA,3Aq$.

Solubility.—This drug is readily soluble in water and in alcohol.

Incompatibility.—Asaprol is incompatible with all the salts that precipitate lime, particularly with the soluble sulphates and the bicarbonate of sodium; it is also incompatible with the iodide of potassium and the quinine salts.[1]

Physiological Action.—No extended studies have been made regarding the general physiological action of this medicament, but it has been found that it reduces hyperpyrexia very decidedly. It causes an increase in the amount of urine secreted. Asaprol appears to be a powerful antiseptic, solutions of it of the strength of 5 per cent. preventing the growth of the microbes of Asiatic cholera, the germs of which are destroyed by stronger solutions of the drug.

Therapeutic Applications.—This remedy is claimed to have acted most advantageously in acute articular rheumatism and in acute and subacute polyarticular rheumatism. As an antipyretic it has been used with success in typhoid fever, influenza, and pneumonia. Good results have been observed in acute tonsillitis both of adults and of children, as well as in the treatment of boils and in that of infectious diseases accompanied with albuminuria. In the latter cases the albumen has disappeared from the urine in a short time. As an analgesic asaprol has been serviceable in sciatica, intercostal neuralgia, tic douloureux, and the pains of muscular rheumatism. Asthma has been relieved by this drug, and beneficial results have been noticed from its use in rebellious cases of chronic rheumatism.

[1] Asaprol must not be mistaken for a recent disinfectant which goes under the name of *saprol*. Saprol appears in the form of an oily brown liquid having an odor of carbolic acid, with a sp. gr. of .099. It is said to contain .43 per cent. of phenol, 53.9 per cent. of cresol, and 2.8 per cent. of hydrocarbons, pyridin, and other bases. Saprol has been employed with asserted excellent success as a disinfectant, particularly of fecal matters.

Administration.—The remedy may be given in doses of from 15 to 60 grains (1 to 4 grammes) in cachets, or in solution of the strength of 5 per cent.; it can then be administered in anise-water, beer, or coffee. For its antiseptic action asaprol can be used for gargles and for vaginal, urethral, and rectal injections from solutions of the strength of from 2 to 5 per cent. This drug may be employed also in the form of an ointment.

ASEPTOL.

This body goes under the various names of *orthophenolsulphonic acid*, *sozolic acid*, *sulphocarbolic acid*, and *sulphonic acid*, and is obtained from the interaction of concentrated sulphuric acid and phenic acid. The formula of *aseptol* is $C_6H_4OH.SO_2.OH$.

Physical Properties.—This drug crystallizes in small deliquescent needles, but it generally appears in the form of a heavy reddish liquid of a syrupy consistency. It has an astringent taste and an odor resembling that of phenol. Its sp. gr. is 1.400.

Solubility.—*Aseptol* is freely soluble in water, alcohol, and glycerin.

Therapeutic Applications.—This remedy has been advantageously employed, mainly as an antiseptic, in diseases of the bladder, eye, and skin. It has rendered good service in the treatment of diphtheritic laryngitis and in pharyngitis. Locally, it has been recommended in gingivitis and pyorrhœa.

Administration.—Aseptol is best administered in the form of a lemonade of the strength of 45 grains to the pint of water (3 in 33.6 grammes). As a local application, solutions of a strength varying from 1 to 10 per cent. may be used.

ASPARAGIN.

Asparagin is a vegetable principle obtained from *Asparagus officinalis* and various other allied plants.

Physical Properties.—Asparagin itself appears as a

crystalline body, but the quite recent combination *asparagin hydrargyrate*, in ½ per cent. solution, is a colorless, limpid liquid having a sharp metallic and acrid taste.

Therapeutic Applications.—Asparagin has diuretic properties, and has been used with asserted success for the purpose of increasing the activity of the kidneys. The hydrargyrate has of late been tried, with alleged excellent results, as an antisyphilitic.

Administration.—*Hydrargyrate of asparagin* is administered hypodermatically in single doses of $\frac{1}{6}$ of a grain (0.01 gramme).

ASPIDOSPERMINE.

The name of *Aspidospermine* is given to an alkaloid obtained from the bark of the quebracho plant, or *Aspidosperma quebracho*. This principle has the composition $C_{22}H_{30}N_2O_2$.

Physical Properties.—Aspidospermine occurs in prismatic colorless crystals.

Solubility.—This alkaloid is soluble in 48 parts of alcohol and in 106 parts of ether. It is insoluble in water.

Physiological Action.—This drug very distinctly increases the respiratory movements. It lowers the temperature and slows the action of the heart.

Therapeutic Applications.—This drug has been employed with apparent success in affections of the respiratory tract, such as asthma, dyspnœa, etc.

Administration.—Aspidospermine is given in doses of from ¼ to ½ grain (0.016 to 0.03 gramme). It may also be administered hypodermatically from a solution of the strength of 1 grain to 1 drachm of water (0.06 in 3.9 grammes). This solution must be kept as such by the addition of a little sulphuric acid. At the time of the injection the acid can be neutralized by a little bicarbonate of sodium. The hypodermatic dose of this solution is 15 drops (0.92 cc.).

AURI BROMIDUM.

(Bromide of Gold.)

Bromide of gold has been found serviceable in the treatment of migraine and epilepsy. The dose of the drug is from $\frac{1}{1000}$ to $\frac{1}{100}$ of a grain (0.0006 to 0.006 gramme).

AURI CHLORIDUM.

(Chloride of Gold.)

This salt has of late been employed with success in the treatment of phthisis and other tubercular affections. It is claimed to be of special value in lupus, in doses of $\frac{1}{160}$ of a grain (0.00043 gramme) three times a day.

AURI ET POTASSII BROMIDUM.

(Bromide of Gold and Potassium.)

This new bromine salt is represented by the formula $AuBr_3.KBr + 2H_2O$.

Therapeutic Applications.—Recent studies have demonstrated that *bromide of gold and potassium* possesses valuable therapeutic properties, being highly serviceable in the treatment of epilepsy and hystero-epilepsy.

Administration.—The *gold and potassium bromide* is said to be best administered hypodermatically, the dose being from $\frac{1}{6}$ to $\frac{2}{3}$ of a grain (0.02 to 0.04 gramme).

Toxicology.—Among the disagreeable effects sometimes produced by the drug may be mentioned chills, rigor, and pains about the region of the heart, which, however, are said to soon disappear.

AURI MONOCYANIDUM.

(Monocyanide of Gold.)

The formula of this substance is AuCn. It occurs as a yellow powder.

Solubility.—This drug is insoluble in water, ether, and alcohol.

Therapeutic Applications.—*Monocyanide of gold* has

been employed with asserted success in the treatment of tubercular diseases.

Administration.—This medicament is best administered in cachets, in doses of from $\frac{1}{16}$ to $\frac{1}{4}$ of a grain (0.004 to 0.016 gramme).

AURI TRICYANIDUM.

(Tricyanide of Gold.)

Tricyanide of gold is used for the same purposes for which the monocyanide is employed, and in the same doses.

BEBEERINE.

The principal alkaloid of *Nectandra rodiæi.*

Physical Properties.—*Bebeerine*, or *buxine*, as it is sometimes called, occurs as an amorphous powder, odorless, and of an exceedingly bitter taste.

Solubility.—This alkaloid is slightly soluble in water, but is readily dissolved by alcohol and ether.

Physiological Action.—No very extended researches have been made regarding the physiological action of this substance. It is said, however, to exercise a destructive influence on the lower organisms, but in this respect it is inferior to the alkaloids of cinchona. On frogs bebeerine produces muscular weakness accompanied with an increase in the number of respirations, followed by clonic and tonic general convulsions, although the reflexes remain apparently unaffected.

Therapeutic Applications.—The *sulphate* of bebeerine, the salt generally employed in practical medicine, is used as an antiperiodic in the treatment of certain forms of neuralgia of malarial origin.

Administration.—This drug is administered in doses of from 2 to 5 grains (0.15 to 0.3 gramme).

BENZ-ANALGEN.

This is another recent derivative of chinolin. It is the *ortho-oxyethyl-anamo-benzoyl-amido-chinolin.* It is

chemically represented by the formula $C_9H_5.OC_2H_5.NHCOC_6H_5.N$.

Physical Properties.—*Benz-analgen* occurs in the form of tasteless, colorless crystals having a melting-point of 406.4° F. (208° C.). The drug leaves no residue on being heated upon platinum wire.

Solubility.—This drug is readily soluble in hot alcohol and in dilute acids, slightly soluble in cold alcohol, and scarcely so in water.

Physiological Action.—Benz-analgen is dissolved by the gastric juice, and appears in the urine in from half an hour to an hour after its ingestion by the stomach. It is broken up in the stomach into *benzoic acid* and *ortho-oxyethyl-ana-amido-chinolin*, the presence of the latter body in the urine being shown by a reddish tint, as in the case of analgen.

Therapeutic Applications.—Like analgen, the *benzoyl* compound has antiseptic properties, and also the power of dissolving uric acid. It produces antithermic and antineuralgic effects similar to those of phenacetin and superior to those of analgen. It has been observed that the reduction of the temperature (in phthisical patients especially) by benz-analgen is accompanied by profuse sweating, but without other disagreeable effects. This drug has been found quite effective in cephalalgias and essential neuralgias. It is affirmed to be of service also in muscular rheumatism, in tabes, and in chronic gout. In all these latter disorders it has been efficacious in relieving pain.

Administration.—Benz-analgen may be given in daily quantities of from 7½ to 45 grains (0.5 to 3 grammes), or even as high as 75 grains (5 grammes).

BENZANILID.

This compound, named likewise *phenyl-benzamid* and *benzoyl-anilid*, has a chemical formula of $C_6H_5.NH.CO.C_6H_5$. It is obtained from the interaction of benzoic anhydride or benzoyl chloride and anilin, and bears the

same relation to benzoic acid as does acetanilid to acetic acid.

Physical Properties.—*Benzanilid* appears as a white crystalline powder with a melting-point of 323.6° F. (162° C.).

Solubility.—This drug is soluble in 58 parts of cold and in 7 parts of hot alcohol. It is not soluble in water.

Therapeutic Applications.—The clinical uses of benzanilid are allied to those of acetanilid. It is employed as an antipyretic, especially in the febrile affections of children.

Administration.—The usual dose for adults is from 3 to 12 grains (0.18 to 0.75 gramme); for children up to twelve years of age, about one-half the amount stated.

BENZONAPHTHOL.

Benzonaphthol is the *benzoate of beta-naphthol*, the chemical composition of which is represented by the formula $C_{10}H_7O,C_7H_5O$. It is obtained by the action of benzoyl on β-naphthol.

Physical Properties.—This drug occurs as a white crystalline powder, tasteless and odorless, with a melting-point of 230° F. (110° C.).

Solubility.—Benzonaphthol dissolves in alcohol, especially in hot alcohol; it is insoluble in water and ether.

Therapeutic Applications.—This drug is said to break up into its components in the intestinal tract. It is generally used as an antiseptic, and acts also as a diuretic. It has been found of service in the treatment of children's diseases, such as acute and chronic gastro-enteritis, catarrhal gastritis, and dysentery; it has rendered good service also in the tubercular form of enteritis.

Administration.—Benzonaphthol is best given in wafers, in doses of from 4 to 8 grains (0.25 to 0.50 gramme). For a child six months old the daily dose of the remedy may be set down as from 6 to 8 grains (0.37 to 0.50 gramme), which may be increased according to

the age of the patient. It is advised to give the medicament in divided amounts.[1]

BENZO-PHENONEID.

This new compound is obtained from an anilin dye, and chemically is the *tetramethylo-diapsido-benzo-phenoneid.*

Therapeutic Applications.—This drug has been efficaciously employed as a microbicide. It has given excellent results in the treatment of obstinate ulcers, and particularly in the treatment of purulent keratitis and chronic phlyctenular ophthalmia. The remedy is locally applied.

BENZOYL-EUGENOL.

This body, which occurs in acicular, colorless, and odorless crystals, is a derivative of *eugenol.* It has a melting-point of 158.9° F. (70.5° C.), and is represented by the formula $C_6H_3.C_3H_5(OCH_3)CO_2C_6H_5$.

Solubility.—This drug is soluble in alcohol, ether, chloroform, and acetone; it is insoluble in water.

Therapeutic Applications.—*Benzoyl-eugenol* is at present being tried in the treatment of tuberculous diseases. The proper dose has not been accurately determined.

BENZOYL-GUAIACOL.

The common name of *benzosol* is given to the substance under consideration. It is the *benzoate of guaiacol*, which contains 54 per cent. of guaiacol. In this compound the hydrogen atom of the hydroxyl is substituted

[1] There has appeared upon the market recently an analogous body under the name of *benzo-paracresol.* It is obtained by the action of sodium benzoate upon paracresol in the presence of oxychloride of phosphorus, the product being made to crystallize from alcoholic solution. Benzo-paracresol appears then as a crystalline body having a marked ethereal odor and a melting point of 158° to 150° F. (70° to 71° C.). The drug is readily soluble in ether, but is insoluble in water and chloroform; it is soluble in alcohol in from 4 to 20 per cent.

by benzoyl. Its chemical nature is represented by the formula $C_6H_4\begin{cases}OCH_3\\OCOC_6H_5\end{cases}$.

Physical Properties.—*Benzosol* is a colorless and almost tasteless and odorless powder with a melting-point varying from 132.8° to 136.4° F. (56° to 58° C.).

Solubility.—*Benzoyl-guaiacol* is perfectly soluble in hot alcohol, ether, and chloroform, but is insoluble in water.

Therapeutic Applications.—*Benzosol* is especially useful as an antiseptic in intestinal disorders and in phthisis pulmonalis. Its lack of taste makes it a remedy superior to the guaiacol itself in the treatment of the latter affection.

Administration.—Benzoyl-guaiacol is best given in chocolate pastilles, with peppermint oil or sugar, or in powder form. The dose of the drug is from 3 to 12 grains (0.18 to 0.75 gramme).

BETOL.

Betol goes under various names, such as *naphtalol*, *naphthosalol*, and *salinaphthol*. It is a salicylate of naphthol ether or a salicylate of β-naphthol. Betol is closely allied to salol, and is represented by the formula C_6H_4-OHCO-$OC_{10}H_7$.

Physical Properties.—This remedy occurs, when absolutely pure, as a crystalline colorless powder without odor or taste. It melts at 203° F. (95° C.).

Solubility.—Boiling alcohol in the proportion of 1 to 3, and ether, benzene, and linseed-oil, readily dissolve this drug. Betol is slightly soluble in alcohol at ordinary temperatures and in turpentine. It is insoluble in water and glycerin.

Therapeutic Applications.—Under the action of the intestinal juices this drug is decomposed into naphthol and salicylic acid. Betol has been used with advantage in articular rheumatism, vesical catarrh, and cystitis. Gonorrhœa has been benefited by the drug.

Administration.—Betol can best be administered in pill form or in emulsion, in doses of from 2 to 5 grains (0.15 to 0.3 gramme). For bougies this medicament may be used as an ointment of the strength of 1 part to 4 parts of cacao-butter.

BISMUTH NAPHTHOLATE.

The *naphtholate of bismuth* is an odorless, neutral brown powder which, when taken into the stomach, is said to break up in the intestines into bismuth and beta-naphthol.

Solubility.—This drug is insoluble in water.

Therapeutic Applications.—*Betanaphthol-bismuth* has been employed with alleged good results in gastro-intestinal disorders and in the treatment of Asiatic cholera.

Administration.—This remedy may be administered in daily doses of from 15 to 30 grains (1 to 2 grammes).[1]

BISMUTH TRIBROMPHENATE.

Under this title a new combination of bismuth has recently been ushered into practical medicine. The drug is also termed *tribromphenol-bismuth*. It is said to contain about 50 per cent. each of tribromphenol and the oxide of bismuth.

Physical Properties.—*Tribromphenate of bismuth* is a yellow, odorless, and insipid powder.

Solubility.—This drug is insoluble in water.

Therapeutic Applications.—*Bismuth tribromphenate* is said to be an excellent antiseptic. It has been advantageously used in the treatment of choleraic diseases. This drug is alleged to exercise a decided power against the bacilli of Asiatic cholera, arresting their development and even destroying them. No untoward effects have been observed from the action of the medicament, even when employed in comparatively large doses.

[1] *Phenol bismuth* and *pyrogallol-bismuth* have been used for the same purpose as the betanaphthol-bismuth, also with apparently good results.

Administration.—The average dose of this substance is put down as from 60 to 75 grains (4 to 5 grammes) a day.

BOLDOA FRAGRANS.

Recent investigations have pointed to the existence in this plant of a glucoside termed *boldin*,[1] the chemical nature of which still remains unknown.

Therapeutic Applications.—The active principle, or boldin, is said to act as a local anæsthetic. A tincture of the plant has been employed with asserted success as a diuretic in diseases of the liver and in rheumatism.

Administration.—The tincture of *boldoa* is given in doses of from 10 to 15 minims (0.6 to 1 gramme).

BROMAL HYDRATE.

Bromal hydrate is analogous to chloral hydrate. It is obtained by the action of bromine upon alcohol. The alcohol, by losing two atoms of hydrogen, is first converted into aldehyde, and the other three atoms are then replaced by the bromine. Its formula is C_2HBr_3O,H_2O.

Physical Properties.—This drug occurs in the form of a white crystalline substance with a pungent taste and an odor resembling that of chloral.

Solubility.—*Hydrate of bromal* is soluble in water, but somewhat less so than chloral.

Physiological Action.—Small doses cause in the lower animals restlessness, contraction of pupil, increased secretion of the buccal and nasal mucous membrane, and respiratory stimulation followed by a decrease of the same. This drug acts upon the heart-muscle directly and more powerfully than does chloral. It is also a powerful stimulant to the excito-motor centres. These effects are aggravated under large quantities of bromal hydrate, and death, which occurs from respiratory failure, is preceded by convulsions and anæsthesia.

[1] *Boldoa chiliensis* is also said to yield a principle termed *boldin*, which has been used in biliary calculi and as a hypnotic in doses of 3 grains (0.25 gramme) a day, administered in capsules.

Therapeutic Applications.—Bromal hydrate has analgesic and hypnotic properties, and is employed for the same purposes as chloral, but it is more powerful than the latter remedy.

Administration.—This drug is given in doses of from 2 to 5 grains (0.12 to 0.3 gramme).

BROMAMID.

A compound said to contain 75 per cent. of bromine. It belongs to the anilid group, and is represented by the formula $C_6H_2Br_3NH.HBr$.

Physical Properties.—*Bromamid* appears in the form of acicular crystals which are colorless, odorless, and tasteless. The drug melts at 243° F. (117.2° C.) and volatilizes at 310° F. (154.4° C.).

Solubility.—This drug is readily soluble in chloroform, ether, and the fixed oils, slightly soluble in alcohol, but insoluble in either cold or hot water and in benzene.

Therapeutic Applications.—Bromamid has antineuralgic and antipyretic properties. This remedy has been used with advantage in rheumatic fever, typhoid fever, and in the treatment of both acute and chronic articular rheumatism. It has also been used with asserted success in several forms of neuralgia and in dropsy of nephritic origin.

Administration.—The dose of bromamid is from 10 to 15 grains (0.6 to 1 gramme), and it is best given in wafers, capsules, or in the form of emulsion; for children the dose is from 1 to 5 grains (0.06 to 0.3 gramme).

BROMOFORM.

The action of bromine upon equal parts of methylic alcohol and caustic potash gives rise to the formation of *bromoform*, a drug known also as *tribromomethane*. This body is analogous to chloroform, and when chemically pure is represented by the formula $CHBr_3$.

Physical Properties.—Bromoform is a colorless, sweet, limpid liquid with an agreeable odor. It boils at

from 296.6° to 308.8° F. (147° to 151° C.) and solidifies at 36° F. (2.5° C.); its sp. gr. is 2.83 at 32° F. (0° C.).

Solubility.—This drug is soluble in alcohol and ether, but only slightly soluble in water.

Physiological Action.—Bromoform has general anæsthetic properties. Under its influence the respiration is not affected, but the blood-pressure is lowered. Anæsthesia is slowly developed and similarly disappears. This drug causes great irritation of the conjunctival and nasal mucous membrane and a diminished irritability of the cerebral cortex. It is said also to be a powerful antizymotic.

Therapeutic Applications.—Bromoform is powerful and prompt in its action. It has chiefly been used as an antispasmodic, analgesic, and antiseptic. This remedy is of special value in the treatment of whooping-cough. Locally applied, it has given excellent results in ozæna and in tuberculous and other ulcers. Bromoform has been employed as a general anæsthetic, but with little, if any, success.

Administration.—For children the remedy is best given in alcoholic solutions, in syrup of acacia, or combined with paregoric, in doses of from 1 to 5 minims (0.06 to 0.30 gramme) three times a day.

BROMOL.

The name of *tribromophenol* is likewise given to the above drug, and it is prepared by the action of bromine upon an aqueous solution of phenol. Its chemical composition is $C_6H_2Br_3OH$.

Physical Properties.—When pure, *bromol* occurs as a white crystalline substance having an astringent sweetish taste and a disagreeable odor resembling that of bromine. Bromol melts at 203° F. (95° C.).

Solubility.—This drug is readily soluble in alcohol, ether, chloroform, and glycerin, and also in the fatty and ethereal oils, but is insoluble in water.

Physiological Action.—Bromol is comparatively

harmless. As much as 75 grains (5 grammes) have been given to man in the course of six hours without causing deleterious effects except some uneasiness about the abdomen and an unpleasant taste in the mouth.

Therapeutic Applications.—Bromol has been employed successfully as a local remedy in diphtheria, and internally in cholera infantum and in typhus fever as an intestinal disinfectant. Quite recently it has been recommended for the expulsion of tapeworms, being said to be of special value against *mediocanellata* and *bothriocephalus*.

Administration.—For local use bromol is applied from a solution in glycerin of the strength of 1 to 25. Internally, especially in cholera of children, it can be given in doses of from $\frac{1}{12}$ to $\frac{4}{17}$ of a grain (0.005 to 0.015 gramme). For tapeworm the remedy can be given in single doses of from 2 to 4 grains (0.13 to 0.26 gramme) repeated until the expulsion of the animal is effected.

BROUSNIKA.

This plant, known under the common name of *red bilberry* and *red whortleberry*, is the *Vaccinium vitis idæa*. It has not been analyzed as yet.

Therapeutic Applications.—Brousnika has been tried with excellent results as an antirheumatic; it is said to have relieved, and even cured, rebellious cases of rheumatism in which all other treatment, medicinal and otherwise, had proved of no avail.

Administration.—Red bilberry is given in the form of a decoction, in doses of from 2 to 4 drachms (30 to 60 grammes) in water during the course of twenty-four hours.

BRYONIA ALBA.

This plant contains two amorphous alkaloids of an extremely bitter taste, *bryonine* and *bryonidine*, the latter being a powerful irritant to the gastro-intestinal mucous membrane. The chemical nature of the chief alkaloid,

bryonine, which by some investigators is said to be a glucoside, is represented by the formula $C_{18}H_{30}O_{19}$.

Physiological Action.—The action of this plant is not well known. It acts, however, as a gastro-intestinal irritant, producing profuse watery discharges. In small amounts it causes flushing of the face and often headache. Large doses exercise a decided influence also on serous membranes, and it is said that poisonous quantities are apt to produce symptoms of meningitis.

Therapeutic Applications.—The plant itself is used in the treatment of whooping-cough. It has been highly recommended in atonic dyspepsia and in constipation of children, particularly when this latter condition is dependent on insufficient intestinal secretion. Bryonia is well spoken of also in diseases of the chest, such as pleurisy, and similarly in rheumatism. Bryonine has been recommended in hemorrhages.

Administration.—*Bryonia* may be given in the form of powder, in doses of from 7½ grains to 1 drachm (0.5 to 4 grammes). A tincture of the plant is administered in doses of from 1 to 2 fluidrachms (3.75 to 7.50 cc.).

BUTYL-CHLORAL HYDRATE.

This body, which is also known by the name of *croton-chloral hydrate*, is produced by the action of chlorine upon aldehyde, its formula being $C_4H_5Cl_3O,H_2O$.

Physical Properties.—*Butyl-chloral hydrate* occurs in brilliant crystalline tables.

Solubility.—This drug is soluble in rectified spirits, but only slightly soluble in water.

Physiological Action.—On the whole, the physiological action of this substance may be said to be similar to that of chloral hydrate; but the drug under consideration is said to possess more analgesic power and to be less depressant to the circulation, particularly the heart. Large doses, however, paralyze the cardiac viscus, this phenomenon being preceded by disturbances of respiration and greatly reduced blood-pressure. This drug is

eliminated in the form of *urobutyl-chloralic* acid, said to be analogous to uro-chloralic acid.

Therapeutic Applications.—Butyl-chloral is used as an analgesic and hypnotic. It is valuable in neuralgias, and especially in insomnia due to heart trouble. While useless in toothache, it is said to be of great service in neuralgia due to decayed teeth.

Administration.—The dose of this medicament is 5 grains (0.30 gramme) every hour, and it may be given until 30 grains (2 grammes) are taken.

CACTUS GRANDIFLORUS.

This plant, designated also by the name of *Cereus grandiflora*, has recently been investigated, and is said to contain an alkaloid called *cactine*. The chemical composition of this active principle has not yet been made out.

Physiological Action.—*Nervous System.*—Cactus acts like strychnine upon the spinal cord, increasing the reflexes and causing, in sufficiently large amounts, convulsions, chiefly of spinal origin.

Circulation.—This drug elevates the arterial pressure by acting on the vaso-motor centres and on the cardio-motor ganglia. The cardiac beat is made stronger and its rapidity is increased. Large quantities of the drug diminish both the pulse-rate and the blood-pressure.

Therapeutic Applications.—This plant has been successfully employed as a stimulant in diseases of the heart, especially myocarditis and valvular lesions, as a substitute for digitalis. It seems to be particularly indicated in cardiac weakness and palpitation. This drug has acted well in angina pectoris, and it has been used with good effect also in cardiac dropsy. This remedy is said not to produce cumulative effects, and it is asserted that no untoward symptoms have ever been observed under its influence. It is claimed to be of special value in cases of severe arrhythmia when other medicaments have failed.

Administration.—Two preparations of this plant are

in use—the *tincture* and the *fluid extract*. Of the first the dose is from 15 to 20 minims (0.90 to 1.20 grammes), and of the second 5 to 10 minims (0.30 to 0.60 gramme), three times a day.

CAFFEINE TRIIODIDE.

Several salts of caffeine have of late claimed recognition as valuable therapeutic agents, chief among which is *triiodide of caffeine*, which is the *caffeine di-iodide-hydro-iodate*,[1] represented by the formula $(C_{18}H_{10}N_4O_2I_2\text{-}HI)_2 + 3H_2O$.

Physical Properties.—The triiodide of caffeine appears in long dark-green prisms.

Solubility.—This salt is freely soluble in alcohol.

Therapeutic Applications.—This drug, when given internally, is said to liberate iodine in the stomach. It is certainly non-depressant, and is employed as a general heart-tonic, stimulant, and diuretic, especially in cases of dropsy of cardiac origin.

Administration.—The dose of this medicament may be set down as from 2 to 4 grains (0.12 to 0.25 gramme).

CALCIUM SALICYLATE.

The chemical composition of this salt is $CaC_7H_4O_3,\text{-}H_2O$.

Physical Properties.—*Salicylate of calcium* occurs as a white crystalline powder, tasteless and odorless.

Solubility.—This salt is not readily soluble in water.

Therapeutic Applications.—*Calcium salicylate* is of special value in the intestinal disorders of children, such as diarrhœa and gastro-enteritis.

[1] *Carbolate*, *cinnamylate*, *boro-citrate*, *salicylate*, and *phtalate* of caffeine have been highly recommended for hypodermatic use, owing to their solubility and non irritating action upon the mucous membranes. *Boro-citrate* is said to possess antiseptic properties due to the boric acid. *Iodocaffeine*, or *sodium and caffeine*, has recently been recommended as a heart-tonic, in daily doses of from 7½ to 45 grains (0.5 to 3 grammes) in the form of cachets.

Administration.—This drug may be administered in doses of from 8 to 24 grains (0.52 to 1.55 grammes).

CAMPHORIC ACID.

Camphoric acid is obtained by the oxidation of camphor through the action of acids, especially nitric acid. It is a dibasic acid, and has the composition $C_8H_{14}(CO\text{-}OH)_2$.

Physical Properties.—Camphoric acid occurs in acicular crystals, odorless, and of a weak acid taste. It melts at from 175° to 178° F. (79° to 81° C.).

Solubility.—Camphoric acid is soluble in hot water, alcohol, ether, and in fatty oils; it is almost insoluble in cold water.

Therapeutic Applications.—This acid has been used with satisfactory results in the treatment of acute and chronic catarrhal affections of the mucous membranes, such as angina, acute bronchitis, coryza, etc., and in acute and chronic cystitis. It has lately been asserted to be of especial service in the night-sweats of phthisis.

Administration.—This drug is best given in capsules, in doses of from 20 to 30 grains (1.5 to 2 grammes).

CANNABINE.

From *Cannabis sativa* (identical with *Cannabis indica*, or Indian hemp) have been extracted two bodies, *cannabine*, an alkaloid, and *cannabinone*.[1]

Physical Properties.—Cannabine occurs as a syrupy brown liquid, but the *tannate* of the alkaloid is a yellowish-brown powder, bitter in taste and almost odorless.

Solubility.—Tannate of cannabine is freely soluble in water rendered alkaline, slightly soluble in alcohol, and insoluble in water and ether.

[1] *Cannabinone* is a resinous balsamic body obtained from the flower tops of the plant, and is soluble in alcohol, chloroform, ether, benzene, and the essential and fatty oils. The dose of cannabinone is set down as from ½ to 1 grain (0.03 to 0.06 gramme): its taste, which is said to be quite disagreeable, may be disguised by powdered coffee.

Therapeutic Applications.—Both principles have been used as hypnotics, but *cannabine* is said to be especially valuable in acute mania and nervous insomnia.

Administration.—The daily dose of cannabine is from 1 to 5 grains (0.06 to 0.30 gramme). The *tannate* may be given in doses of from 2 to 10 grains (0.13 to 0.60 gramme).

CANTHARIDIN.

This body is the non-alkaloidal active principle obtained from several species of the Spanish fly or beetle, coleopterous insects, especially the *Cantharis vesicatoria*. *Cantharidin* is represented as having the composition $C_{10}H_{12}O_4$.

Physical Properties.—This new agent occurs as a colorless crystalline substance made up of four-sided tables.

Solubility.—Cantharidin is readily taken up by chloroform, ether, and the fatty oils. It is slightly soluble in alcohol, but is insoluble in water.

Physiological Action.—It has been asserted that this drug produces in inflammatory processes a transudation of sanguineous microbicidal serum, but this has been denied, since no such results have been obtained in experiments performed upon the lower animals.

Therapeutic Applications.—This remedy has of late been applied, hypodermatically injected, in the treatment of tuberculosis, but the value of this medicament has not yet been accurately determined. The results so far obtained have not been very satisfactory.

Administration.—The dose of cantharidin has not yet been ascertained.[1]

[1] The *cantharidate of cocaine* is a combination recently introduced into practical medicine. It is a mixture of *cantharidate of sodium* and 1 in 100 of *hydrochlorate of cocaine*. This new compound occurs in the form of a white, inodorous, amorphous powder with a sharp taste, readily soluble in alcohol, ether, benzene, and hot water. It has been employed with alleged happy results in the treatment of tubercular disease. Administered subcutaneously, this remedy is said to be absolutely painless. The single dose is about $\frac{1}{100}$ of a grain (0.0006 gramme).

CARBON BISULPHIDE.

This substance, which has a formula of CS_2 and is known also as *carbon disulphide*, is an agent lately brought into medicinal use.

Physical Properties.—*Carbon bisulphide* is a colorless, inflammable, highly refractive liquid with a strong characteristic odor and an aromatic taste.

Therapeutic Applications.—This drug has been recommended as a local anæsthetic in the treatment of neuralgias and enlarged lymphatic glands.

Administration.—Carbon bisulphide is applied locally.

CARBON TETRACHLORIDE.

Therapeutic Applications.—*Carbon tetrachloride* has anæsthetic properties similar to those of the bisulphide. It is also used in hay fever and as an emmenagogue in dysmenorrhœa.

Administration.—This drug is best employed by inhalation.

CARPAINE.

Carpaine is the active principle recently obtained from the *Carica papaya*, or melon tree. The chemical formula of this alkaloid is $C_{14}H_{27}NO_2$.

Physical Properties.—Carpaine occurs in beautiful crystals having a bitter taste. Its melting-point is 239° F. (115° C.). It forms salts with the mineral acids, the principal one being the hydrochlorate.

Solubility.—This salt is freely soluble in water.

Therapeutic Applications.—Carpaine has been considered as the only substitute for digitalis, having advantageously been employed in the treatment of cardiac affections, particularly in mitral insufficiency and aortic stenosis. This drug acts also as a respiratory stimulant and diuretic.

Administration.—Carpaine is best given hypodermatically in doses of from $\frac{1}{10}$ to $\frac{1}{6}$ of a grain (0.006 to 0.01 gramme) daily or every other day. It may also be em-

ployed by the mouth in daily amounts of $\frac{3}{8}$ of a grain (0.025 gramme), but it is said not to be so effective when given in this manner.

CARVACROL.

This substance, said to be a phenol, is contained in the essential oil of the *Origanum* species. The chemical composition of *carvacrol* is $C_{12}H_{14}O$.

Physical Properties.—*Carvacrol* occurs as a thick oily body with a melting-point of 451.4° to 455° F. (233° to 235° C.). *Iodide of carvacrol* is a yellowish-brown powder.

Solubility.—This salt is freely soluble in chloroform, ether, and olive oil; it is insoluble in water.

Therapeutic Applications.—Carvacrol has only been used locally as an antiseptic in diseases of the skin, and in the treatment of wounds and ulcers as a substitute for iodoform.

Administration.—This drug has been employed in the form of powder, ointment, or gauze.

CASCARA SAGRADA.

Cascara sagrada (sacred bark) is the Spanish name given to the bark of the *Rhamnus purshiana*.

Therapeutic Applications.—Cascara is most valuable as a tonic and laxative, especially in the treatment of habitual constipation. (See *Cascarine*.)

Administration.—The dose of the *fluid extract*, best given after meals, is from 10 to 15 minims (0.6 to 0.9 gramme).

CASCARINE.

This is said to be the active principle of *Cascara sagrada*, from which it has recently been isolated. Later studies have apparently shown that *cascarine* is identical with *rhamno-xanthine*, occurring in the buckthorn, or *Rhamnus frangula*. Cascarine is said to be composed of $C_{12}H_{10}O_5$.

Physical Properties.—This new principle occurs as a fine crystalline, tasteless, and odorless powder having a melting-point of 392° F. (200° C.). Some specimens of cascarine are red, others yellow, and still others orange-yellow, the coloration depending upon the degree of hydration.

Solubility.—Cascarine is soluble in alcohol, chloroform, and alkaline fluids. With the latter it produces a purple-red solution; with alcohol it gives a yellow hue. This drug is slightly soluble in ether, but insoluble in water.

Therapeutic Applications.—This remedy is, like its mother-drug, serviceable in habitual constipation. Intravenous injections of cascarine are said to have produced bilious non-diarrhœal stools.

Administration.—Cascarine may be administered in the form of pills, in daily doses of from 1½ to 3 grains (0.10 to 0.20 gramme), best given before meals.

CATHARTINIC ACID.

Species of *Cassia* yield an active principle known as *cathartinic acid.*

Physical Properties.—This drug occurs in brown hygroscopic scales.

Solubility.—Cathartinic acid is readily dissolved by water and alcohol.

Therapeutic Applications.—This remedy, apparently destitute of poisonous properties, is employed simply as a laxative.

Administration.—Cathartinic acid may be administered in doses of from 4 to 6 grains (0.26 to 0.39 gramme).

CELASTRINE.

This alkaloid has been extracted from the *Celastrus edulis*, but its chemical composition has not been studied as yet.

Physiological Action.—*Nervous System.*—In cold-blooded animals *celastrine* causes excitement at first,

followed by depression. In small amounts it is a decided stimulant to the nervous system. Similar effects are produced on warm-blooded animals.

Circulation.—On the heart of the frog the drug acts as an excitant, producing an increase in the number of pulsations. The same effect is observed in higher animals like the dog. The blood-pressure is not affected by therapeutic doses, but it is diminished under large amounts.

Respiration.—Celastrine produces an increase in the depth of the respiration, but a diminution in the frequency of the movements; these effects are accompanied by marked restlessness of the animal.

Temperature.—This drug causes a rise of the bodily temperature.

Pupil.—Under the action of the medicament the pupil is dilated.

On the whole, celastrine resembles cocaine in its action, producing general excitement, stimulation of the brain, and great increase of the bodily temperature; but, unlike cocaine, celastrine does not abolish sensibility nor does it produce convulsions. The action of this drug on the cord, the vagi, and the heart is much less pronounced than that of cocaine.

Therapeutic Applications.—Although not yet sufficiently tried, celastrine has been found, as already intimated, to have properties similar to those of cocaine. The plant itself is said to possess marked aphrodisiac virtues, but the native Arabs use the drug chiefly to enable them to support hunger and fatigue.

CETRARINE.

Cetrarine is the principle obtained from the common Iceland moss or lichen (*Cetraria islandica*), and has a formula of $C_{18}H_{16}O_8$.

Physical Properties.—Cetrarine occurs in white crystalline acicular needles having a bitter taste.

Solubility.—This drug is freely soluble in boiling alcohol.

Therapeutic Properties.—Cetrarine is a stomachic medicament, and has been successfully employed in disturbances of digestion; it is also valuable in anæmia and chlorosis.

Administration.—This remedy is best given in pill form, in doses of from 3 to 6 grains (0.2 to 0.4 gramme).

CHINOLIN.

Chinolin, also termed *quinolin*, is obtained from cinchonine or quinine by distillation, but it has also been synthetically prepared. Its chemical composition is represented by the formula C_9H_7N.

Physical Properties.—When pure, chinolin is a colorless liquid with a characteristic aromatic pungent odor. It melts at 458.6° F. (237° C.); its sp. gr. is 1.084 at 138° F. (59° C.).

Solubility.—Chinolin is freely soluble in alcohol, ether, chloroform, and hot water; it is insoluble or only slightly soluble in cold water.

Therapeutic Applications.—This drug has been mainly used as an antiseptic and antizymotic. It has some antipyretic properties. This remedy has rendered good service in the treatment of diseases of the pharynx.[1]

Administration.—The dose of chinolin is from 3 to 10 minims (0.2 to 0.6 gramme); that of the *tartrate*, 5 to 15 grains (0.3 to 1 gramme). For local use this drug may be applied in solutions of the strength of 10 per cent., made with rectified spirit or with peppermint-water.

[1] Many salts of chinolin have been recommended therapeutically, the principal one being the *tartrate*, which is soluble in cold water in the proportion of 1 to 70 or 80 parts. The tartate is alleged to have done good in whooping-cough in doses of 1½ grains (0.9 gramme) every three hours, and in malarial fever in doses of 15 grains (1 gramme), in divided amounts, three hours before the expected paroxysms.

CHLORAL AMMONIUM.

This substance is *trichlor-amido-ethylic alcohol*, with a formula of CCl_3,CH,OH,NH_2, or, better, $CCl_3.COH.NH_3$.

Physical Properties.—This drug occurs as a white crystalline powder having a melting-point of 147° F. (64° C.).

Solubility.—*Chloral ammonium* is soluble in alcohol, and slightly so in water.

Therapeutic Applications.—This remedy is used chiefly as an analgesic and hypnotic in a variety of disorders characterized by wakeful nervous insomnia.

Administration.—The dose of chloral ammonium is from 15 to 30 grains (1 to 2 grammes).

CHLORALAMID.

This drug is also termed *chloral-formamid*, and is obtained from the interaction of formamid and chloral. Its formula is given as $CCl_3CH\begin{matrix}OH.\\HNCHO.\end{matrix}$

Physical Properties.—*Chloralamid* is a crystalline and slightly bitter substance with a melting-point of 239° F. (115° C.).

Solubility.—This drug is soluble in alcohol, and in water in the proportion of 1 to 9 parts.

Physiological Action.—*Local Action.*—Chloralamid has a slight local action, and in large amounts tends to produce mucous diarrhœa.

Nervous System.—This drug acts more powerfully upon the cerebral cortex than upon any other portion of the nervous system of voluntary life, thereby causing sleep and muscular relaxation, but it is also a feeble spinal depressant. The reflexes are abolished and the conductivity of the motor nerves is destroyed under sufficiently large amounts.

Circulation.—The influence of this drug upon the circulation is a feeble one, the changes produced by small doses being probably secondary to other effects of

the drug; toxic doses, however, depress arterial pressure by a direct action upon the heart or upon the muscle-coats of the arterioles. The pulse-rate is diminished by large quantities.

Respiration.—Chloralamid in moderate doses has a powerful influence upon the respiration by a centric action stimulating the respiratory rate, and probably also by increasing the actual amount of air breathed, but in toxic doses it depresses this function, and finally kills by respiratory failure.

Metabolism.—The excretion of urea is increased by small doses, but is diminished by large ones. The excretion of phosphates appears to be decreased both by large and by small doses of the drug.

Urine.—Small amounts have no apparent effect upon the renal function, but large doses diminish the excretion of the fluid constituents of the urine.

Therapeutic Applications.—Chloralamid is used advantageously as a hypnotic in a large variety of nervous disorders, and in this respect it is considered safer than, and superior to, chloral, especially in the sleeplessness occurring in cardiac affections. This drug produces sleep in from half an hour to forty-five minutes after its ingestion, the sleep lasting from five to eight hours. This remedy has given excellent results in nervous insomnia, in neuralgia, and even in tabes dorsalis. Chloralamid not only causes sleep, but also relieves pain. Recently this medicament has been found of great service, particularly when combined with bromide of potassium, in the treatment of seasickness.

Administration.—This drug is best given in water, in doses of from 30 to 50 grains (2 to 3.5 grammes).

Toxicology.—No fatal results from the use of chloralamid have been reported, yet untoward effects consisting of skin-eruptions have been observed, these disappearing on discontinuing the employment of the medicament.

CHLORAL-CAFFEINE.

This new preparation is said to be a molecular combination of the two drugs chloral and caffeine, and is represented by the formula $C_8H_{10}N_4O_2.CCl_3CH:O$.

Physical Properties.—*Chloral-caffeine* occurs in the form of white shining leaflets.

Solubility.—This drug is readily soluble in cold water.

Incompatibility.—Alkalies decompose the combination into chloroform and caffeine.

Therapeutic Applications.—This remedy has been found of great value in the treatment of rheumatic affections such as sciatica. It is said to have relieved violent asthmatic attacks. Observers claim that this medicament is of particular service in cases of irritation of the peripheral nervous system. The subcutaneous use of this drug is asserted to be painless.

Administration.—Chloral-caffeine has been employed hypodermatically in doses of from 3 to 4½ grains (0.2 to 0.3 gramme) each, or in daily amounts of from 6 to 13½ grains (0.4 to 0.9 gramme).

CHLORALOSE.

Chloralose is the name given to a recent derivative of chloral obtained by heating the latter substance with glucose. Chloralose with sulphuric acid gives a di-sulphuric compound, and with acetic anhydride a compound containing four acetyl groups. The formula of this new substance is said to be $C_8H_{11}Cl_3O_6$.

Physical Properties.—Chloralose occurs in the form of fine needles which volatilize completely without decomposition.

Physiological Action.—This drug causes sleep in birds, cats, and dogs, as well as in man; it has the advantage over chloral of not depressing the spinal cord. This new remedy acts also as an analgesic.

Therapeutic Applications.—Chloralose has been

employed with success as a hypnotic, in those cases especially in which pain appears a prominent symptom.

Administration.—The dose of this new medicament is put down as from 3 to 14 grains (0.20 to 0.90 gramme).

Toxicology.—The drug is apt to produce symptoms of poisoning similar to those of chloral.

CHLORPHENOL.

This substance is the *monochlorphenol*, represented by the formula $C_6H_4Cl.OH$.

Physical Properties.—This drug occurs as a volatile liquid heavier than water.

Therapeutic Applications.—*Chlorphenol* possesses antiseptic and antituberculotic properties. It has rendered marked service in the treatment of tubercular diseases. This remedy has likewise been employed successfully against bronchitis, laryngitis, and ozæna. Locally applied, it has done good in the treatment of discharging glands, ulcers, and wounds.

Administration.—Monochlorphenol is usually administered by inhalation, but, as above stated, it is also employed as a local application.[1]

CHROMIC ACID.

Chromic acid, or, better, chromic anhydride, is obtained from potassium bichromate by the action of sulphuric acid. Its formula is CrO_3.

Physical Properties.—This drug appears in long, hygroscopic, red, rhombic prisms or needles.

Solubility.—Chromic acid is readily dissolved by water.

[1] *Para-monochlorphenol* ($C_6H_4Cl.OH$), occurring in crystalline form, soluble in alcohol, ether, and alkalies, but sparingly so in water, and *ortho-monobromphenol* ($C_6H_4Br.OH$), appearing as a dark-violet liquid, soluble in alcohol, ether, alkalies, and water, have been employed with alleged advantage in the local treatment of erysipelas. They are said to lower the temperature and to remove the congestion of the affected area without producing cutaneous irritation. Either of the two medicaments can be used in ointments of the strength of from 3 to 6 per cent. The ointment may be rubbed in once or twice a day.

Therapeutic Applications.—This medicament is employed externally as a powerful caustic in the treatment of tumors, hypertrophied tonsils, excrescences, syphilitic ulcers, etc. It is likewise used in tenderness and hypersecretion of the feet, as a hæmostatic, in gonorrhœa, and in ozæna.

Administration.—The solutions of chromic acid should be of the strength varying from 1 to 5 per cent. For ozæna and gonorrhœa aqueous solutions of the drug can be made of the strength of 1 : 1000.

CHRYSAROBIN.

Chrysarobin is obtained from the wood of the tree *Andira araroba*. Its chemical composition is $C_{30}H_{26}O_7$.

Physical Properties.—This drug occurs as a yellowish, crystalline, tasteless powder.

Solubility.—Chrysarobin is soluble in alcohol, benzene, chloroform, ether, and in alkaline and acid solutions; it is somewhat soluble in water in the proportion of 1 to 200 parts.

Physiological Action.—This powder is an active irritant poison; when taken internally, even in moderate amounts, it produces gastro-intestinal symptoms, such as vomiting and purging. Its local application is sometimes followed by violent cutaneous irritation.

Therapeutic Applications.—This remedy is serviceable in the treatment of parasitic diseases of the skin, especially in psoriasis, internally and locally administered.

Administration.—The dose of chrysarobin varies from ⅛ to ¼ of a grain (0.008 to 0.015 gramme). Externally, it is applied in the form of ointment of a 10 per cent. strength. This medicament should not be applied to the face, since it causes a dark-brown discoloration of the skin.

CINERARIA.

The plant *Cineraria maritima* has not been analyzed as yet, but it is said to possess medicinal virtues of value.

Therapeutic Applications.—The fresh leaves of the plant furnish a juice which is claimed to be beneficial in the treatment of cataract without operation.

Administration.—The juice is simply dropped into the eye, in doses of 2 minims (0.15 gramme) three times a day.

COCAINE PHENATE.

This new combination of cocaine contains about 75 per cent. of the alkaloid.

Physical Properties.—*Cocaine phenate* occurs as a viscid yellowish mass.

Solubility.—This new medicament is soluble in alcohol, but insoluble in water.

Therapeutic Applications.—This drug is employed as a local anæsthetic in catarrhal affections of the nose and stomach and in other disorders.

Administration.—Cocaine phenate may be given internally, in capsules, in doses of from $\frac{1}{12}$ to $\frac{1}{6}$ of a grain (0.005 to 0.01 gramme). It may also be used by insufflation. For local application the strength of the solutions may vary from 5 to 10 per cent.

CODEINE.

This alkaloid is represented by the formula $C_{18}H_{21}NO_3$. The new salt, the *phosphate*, is represented by the formula $C_{18}H_{21}NO_3$-H_3PO_3,1½Aq.

Physical Properties.—The alkaloid occurs in colorless bitter crystals with a melting-point of 302° F. (150° C.). The *phosphate of codeine* appears in white needles which are also of a bitter taste.

Solubility.—*Codeine* is readily soluble in alcohol and ether, and in boiling water in the proportion of 1 to 17 parts. *Codeine phosphate* is soluble in water, and slightly so in alcohol.

Physiological Action.—The action of codeine is similar to that of morphine. As a narcotic codeine is less powerful than its sister alkaloid, and in large quan-

tities causes tetanus more frequently than does morphine. Codeine paralyzes the peripheral motor nerves. The pulse, blood-pressure, and respiration are not affected except by toxic doses. This drug exercises no deleterious action on the alimentary tract.

Therapeutic Applications.—Codeine has been highly recommended as an excellent nervous sedative. It has been employed with advantage in bronchitis and in all kinds of irritating cough, as that of phthisical patients. It has been lauded as having a special value in diabetes mellitus. The salt here referred to is said to possess special advantages in mental disorders, and to have given excellent results in the treatment of morphinism.

Administration.—The dose of the alkaloid or of the salt is put down as from 1½ to 2 grains (0.09 to 0.12 gramme).

COLCHICEINE.

By a process of hydrolysis *colchicine* yields a substance which has been termed *colchiceine*, having a chemical composition of $C_{21}H_{22}(OH)NO_5$.

Solubility.—Colchiceine is readily soluble in boiling water, alcohol, and chloroform, and slightly soluble in cold water.

Physiological Action.—The action of this substance has not been accurately ascertained, but it is said to behave very much like colchicine, causing, in sufficiently large quantities, vomiting and severe purging with tenesmus, and a rapid pulse at first, followed by a decrease of cardiac rate, and finally by heart-paralysis. Death occurs without convulsive phenomena. The urine seems to be at first increased and afterward diminished in amount.

Therapeutic Applications.—This drug has been mainly employed, with alleged success, in the treatment of acute rheumatism and gout.

Administration.—Colchiceine is best given hypodermatically in doses of from $\frac{1}{60}$ to $\frac{1}{30}$ of a grain (0.001 to 0.002 gramme).

COLCHICINE.

Colchicine is the active principle of the common meadow-saffron (*Colchicum autumnale*), its formula being $C_{21}H_{22}$-$(OCH_3)NO_5$.

Physical Properties.—This drug occurs as an amorphous body with a melting-point of from 289.4° to 296.6° F. (143° to 147° C.).

Solubility.—Colchicine is readily soluble in water, alcohol, and chloroform.

Physiological Action.—This alkaloid resembles the mother-drug in its action. It is a violent gastro-intestinal irritant, poisonous doses producing great prostration, vomiting, and severe purging. This drug causes a period of excitement accompanied by convulsions with greatly increased reflexes, followed by abolition of reflex actions and paralysis. The higher nerve-centres, like the cord and the peripheral sensory nerves, are decidedly affected by the drug, but the motor nerves as well as the muscles remain intact. Upon the circulation, the respiration, and the temperature the drug exercises, in moderate amounts, little or no influence.

Therapeutic Applications.—Like colchiceine, the remedy under consideration has been employed in the treatment of rheumatism and gout, with alleged success. It is also recommended in sciatica.

Administration.—The dose of colchicine varies from $\frac{1}{120}$ to $\frac{1}{20}$ of a grain (0.0005 to 0.003 gramme).

CONDURANGO.

The bark of *Gonobolus condurango* is said to contain a glucoside and other active principles.

Therapeutic Applications.—Condurango is mostly used as an alterative in syphilis and cancer. It is also effective as a stomachic tonic.

Administration.—The only preparation used at present is the *fluid extract*, the dose of which is from 20 to 30 minims (1.2 to 2 grammes).

CONESSINE.

From the bark of the two plants *Holarrhena africana* and *Holarrhena antidysenterica* has been extracted an alkaloid termed *conessine*, the chemical composition of which is put down as $C_{20}H_{40}N_2$.

Physical Properties.—*Conessine* appears as a crystalline acicular substance with a melting-point of 249.8° F. (121° C.).

Solubility.—Conessine is freely soluble in alcohol, chloroform, and ether. Water dissolves it with difficulty.

Therapeutic Applications.—This drug appears to be of service in the treatment of diarrhœa and dysentery, but its therapeutic value in these disorders and its proper dose have not been ascertained with accuracy.

CONIINE HYDROBROMATE.

This salt, called also *conicine* and *cicutine*, is represented by the formula $C_8H_{17}N,HBr$.

Physical Properties.—This body occurs in transparent colorless prisms.

Solubility.—This salt is soluble in water, and in alcohol in the proportion of 1 to 2 parts; it is slightly soluble in ether.

Physiological Action.—The action of this salt is the same as that of the mother-substance, conium. It acts chiefly on the motor nerves. The sensory nerves and the spinal cord are only feebly depressed, while the brain remains unaffected. This drug produces paralysis of the peripheral oculo-motor fibres, and thus dilates the pupil. On the circulation the action is also a feeble one, but in sufficiently large amounts the drug paralyzes the vagi.

Therapeutic Applications.—*Coniine hydrobromate* has rendered good service as an antispasmodic and antineuralgic in the treatment of whooping-cough, tetanus, sciatica, and other affections of a similar nature.

Administration.—For adults the dose of the hydrobromate of coniine is $\frac{1}{30}$ to $\frac{1}{15}$ of a grain (0.002 to 0.004

gramme); for children, $\frac{1}{600}$ to $\frac{1}{60}$ of a grain (0.0001 to 0.001 gramme).

Toxicology.—The chief symptoms of poisoning produced by coniine are those caused by hemlock itself. They consist of giddiness, staggering, and disturbed vision, followed by complete muscular relaxation. There occur nausea, sometimes vomiting, frontal headache, *ptosis* of the eyelids, and *dilated* pupils. The pulse is at first slow and then becomes rapid. Salivation and sweating are sometimes observed. Death occurs from respiratory failure. In case of poisoning the stomach should be evacuated at once and tannic acid administered freely. Hypodermatic injections of strychnine, caffeine, and digitalis, together with the application of external heat and artificial respiration, should be resorted to.

CONVALLAMARIN.

The glucoside of *Convallaria majalis*, commonly called the "lily-of-the-valley." The chemical nature of this principle is represented by the formula $C_{23}H_{44}O_{12}$.

Physical Properties.—*Convallamarin* appears in the form of a whitish-brown amorphous powder.

Solubility.—This drug is soluble in water and in alcohol.

Physiological Action.—The chief actions of this drug appear to consist of a reduction of the pulse-rate and a marked increase in the flow of urine. It rarely produces nausea and vomiting.

Therapeutic Applications.—Convallamarin is chiefly used as a cardiac stimulant. This remedy has been found to be of special value in mitral stenosis with failing heart-action.

Administration.—The dose of convallamarin is from ½ to 1 or 2 grains (0.03 to 0.06 or 0.12 gramme).

CONVALLARIN.

This is a second active principle of *Convallaria majalis*.

Physical Properties.—*Convallarin* occurs as a crystalline body.

Solubility.—This drug is soluble in alcohol, but insoluble in water.

Physiological Action.—Nausea, diarrhœa, and gastric pain are the chief symptoms produced by convallarin.

Therapeutic Applications.—This medicament has been used purely for its purgative effects.

Administration.—This remedy is given in doses of from 2 to 4 grains (0.12 to 0.24 gramme).

CONVOLVULIN.

From several plants of the genus *Ipomœa*, but especially from *Ipomœa purga*, is obtained the glucoside *convolvulin*. Its chemical formula is $C_{31}H_{50}O_{16}$.

Physical Properties.—Convolvulin occurs as an amorphous mass.

Solubility.—This glucoside is readily soluble in alcohol and in acetic acid; it is insoluble in water.

Therapeutic Applications.—Although the drug possesses errhine properties, it has chiefly been employed as an effective purgative.

Administration.—The dose of convolvulin is 1½ to 3 grains (0.09 to 0.18 gramme).

CORNUTINE.

This body is considered the most active constituent of ergot (*Secale cornutum*). No chemical analysis of the drug has been made.

Physical Properties.—*Cornutine* appears as a brownish-gray amorphous powder; it is said to be an alkaloid.

Solubility.—This alkaloidal remedy is scarcely soluble in water, but its salts, more especially the *citrate* and the *hydrochlorate*, are dissolved by water.

Therapeutic Applications.—This drug is asserted to be of advantage in hemorrhages from the genito-urinary organs of both males and females. Although apparently useless in spasmodic spermatorrhœa, this drug has given excellent results in the treatment of the ordinary paralytic form of the disease.

Administration.—Cornutine may be given in daily doses of from $\frac{1}{6}$ to $\frac{1}{4}$ of a grain (0.01 to 0.015 gramme). For spermatorrhœa this drug has been recommended in daily amounts of from $\frac{1}{20}$ to $\frac{1}{10}$ of a grain (0.003 to 0.006 gramme).

CORONILLA.

Of the two closely-allied species of this plant, *Coronilla scorpioides* and *Coronilla varia*, the latter has been found to be the more useful. No principles have been extracted as yet.

Therapeutic Applications.—This drug is employed as a heart-tonic, especially in cases where digitalis has failed to be of service. Clinically, it has been found that coronillin increases the energy of the cardiac muscle; the pulse is strengthened and diuresis is increased, as a consequence of which œdema and dyspnœa are relieved. But the effects of the drug appear to be of short duration. Coronilla itself seems to be indicated in painful reflex symptoms of heart disease and in cardiac neurosis. In these cases the drug seems to act as an anodyne. It is likewise asserted that it possesses cathartic and diuretic properties.

Administration.—Two preparations of coronilla are now in use: a *tincture* of the entire plant, of the strength of 1 : 5, the daily dose of it being from ½ to 1 fluid-drachm (2 to 4 grammes); and a *powder* made from the flowers, which is given in quantities of from 15 to 30 grains (1 to 2 grammes) a day.

COTOIN.

To a neutral principle obtained from the bark of a species of *Nectandra* there is given the name of *cotoin*, its chemical composition being $C_{22}H_{18}O_6$.

Physical Properties.—This new agent occurs as an amorphous crystalline powder of a pale yellowish color.

Solubility.—Cotoin is readily soluble in ether, alcohol, chloroform, and the alkalies; it is only slightly soluble in water.

Therapeutic Applications.—The only marked value attributed to cotoin is as an anticholeric, and as such it is said to exercise a specific action upon the intestinal mucous membrane. This remedy is alleged also to check the night-sweats of phthisis.

Administration.—Cotoin is best given in acetic ether, in which it may be dissolved in the proportion of 1 to 4 parts. Its dose varies from ½ to 2 grains (0.03 to 0.12 gramme).

CREOLIN.

Creolin, a form of cresol, is obtained from coal-tar.

Physical Properties.—This body appears as a black alkaline fluid of the consistency of syrup, its sp. gr. being from 1040 to 1080. It has a characteristic odor.

Solubility.—Creolin is soluble in alcohol, ether, and chloroform, and insoluble in wood-spirit; with water it makes a milky mixture.

Therapeutic Applications.—This remedy is highly valuable as a general antiseptic and sedative. It is of special benefit in cystitis and other diseases of the genito-urinary tract. It has done good service in intestinal disorders, and has been used, internally administered, with asserted success against phthisis. Diseases of the eye and ear have also received benefit from the drug. Creolin has of late been found beneficial, given by the stomach, in the treatment of vascular affections such as chlorosis. This drug is said to be almost a specific in scrofulosis and to be of much value in cholera morbus. In the treatment of the latter disease this drug is added to the milk used for sucklings, and in this manner this fluid becomes thoroughly sterilized.

Administration.—When given internally—and this is best done in capsules—the dose is from 1 to 5 minims (0.06 to 0.3 gramme). For chlorosis and scrofulosis a daily dose of creolin of from 1½ to 2 drachms (6 to 8 grammes) is recommended. To sterilize milk for children suffering from cholera morbus the bottle is first

rinsed with ½ per cent. creolin-water, and to the milk of the bottle is then added 1 drop (0.06 gramme) of the drug. In this manner the taste of the antiseptic is almost wholly destroyed.[1]

CREOSOTAL.

This body is obtained by the action of carbon dioxide upon creosote. It is the *carbonate of creosote*.

Physical Properties.—*Creosotal* occurs in the form of a viscid oily liquid, without odor. It becomes quite fluid on the application of moderate heat, and has a sp. gr. of 1.165 at 59° F. (15° C.).

Solubility.—*Creosote carbonate* is soluble in alcohol, ether, chloroform, and benzene; it is insoluble in water.

Physiological Action.—When ingested by the stomach, even in large doses, this drug exercises no deleterious influence. It is said to be decomposed in the intestines into its components, creosote and carbon dioxide. The former constituent is found in the urine about half an hour after the ingestion of creosotal.

Therapeutic Applications.—Carbonate of creosote has been employed with alleged success in the treatment of tuberculosis.

Administration.—Creosotal may be administered in daily doses of from 7½ to 15 drachms (10 to 20 grammes).

CYTISINE.

Various species of *Cytisus*, especially *Cytisus laburnum*, yield an alkaloid known as *cytisine*, whose chemical composition is $C_{11}H_{14}N_2O$.

[1] The name of *sanatol* has been applied to a thin blackish-brown liquid, soluble in water with a milky turbidity. It is said to be prepared from a so-called 100 per cent. carbolic acid and an excess of concentrated sulphuric acid. The new agent is claimed to be a decided disinfectant: 1 and 2 per cent. solutions, respectively, have been found to destroy the vibrios of cholera and bacterium coli commune in half a minute. Sanatol has not yet been tried in practical medicine.

Physical Properties.—This alkaloid itself occurs in whitish-yellow deliquescent crystals. The *nitrate* of the drug is the preparation generally employed for therapeutic purposes; it is of a pale-yellow color and of an acid reaction.

Therapeutic Applications.—This salt, hypodermatically administered, has been employed in the treatment of paralytic migraine. The drug is also said to do good as a diuretic in dropsies of cardiac origin.

Administration.—The dose of *cytisine nitrate*, subcutaneously ingested, varies from $\frac{1}{20}$ to $\frac{1}{12}$ of a grain (0.003 to 0.005 gramme).

DATURINE.

The alkaloid obtained from the seeds and leaves of the common Jamestown weed (*Datura stramonium*). It is claimed to be identical with *hyoscyamine*, and its chemical composition is $C_{17}H_{23}NO_3$.

Physical Properties.—The *sulphate of daturine* appears in white granulate crystals.

Physiological Action.—The action of daturine is similar to that of atropine, the two drugs being identical.

Therapeutic Applications.—*Daturine sulphate* is employed therapeutically as a hypnotic in maniacal subjects.

Administration.—This medicament may be given in doses of from $\frac{1}{120}$ to $\frac{1}{80}$ of a grain (0.00054 to 0.00081 gramme).

DERMATOL.

This term is applied to the *subgallate of bismuth*, which contains 55 per cent. of the oxide of bismuth and is represented by the formula $BiC_7H_7O_7$.

Physical Properties.—*Dermatol* is an odorless, non-hygroscopic, yellow, saffron-like powder.

Solubility.—This drug is insoluble in the ordinary solvents.

Therapeutic Applications.—Dermatol is at present largely used as an antiseptic, in place of iodoform, in all those affections in which the latter remedy is indicated. The *bismuth subgallate* is of service also internally in diseases of the gastro-intestinal tract, as a substitute for the subnitrate salt. It has certainly given good results in the treatment of the diarrhœa of tubercular disease, as well as in that of typhoid fever. It has been very highly recommended in the treatment of fermentative dyspepsia and, locally applied, in various diseases of the skin.

Administration.—The daily dose when given by the mouth is 30 grains (2 grammes), and it may be administered even in as high a quantity as 90 grains (6 grammes). Locally, it may be applied as a dusting-powder, gauze, glycerin or collodion emulsion, or ointment of the strength of from 10 to 20 per cent.

DIAPHTHERIN.

This substance, also called *oxychinaseptol*, which has quite recently been introduced, has a chemical composition of $(OH.C_9H_6N)_2(OH)(SO_3H)C_6H_4$.

Physical Properties.—This new agent occurs as a white powder.

Solubility.—Oxychinaseptol is easily soluble in cold water.

Therapeutic Applications.—Although its medicinal uses have not been very extensive as yet, recent investigations have shown that this new remedy has decided antiseptic properties. It has been employed with most excellent results in aural and nasal diseases. It is claimed to be of the greatest value as a deodorizing agent in cases of offensive otorrhœa and rhinitis. This drug is non-irritant and non-painful.

Administration.—Diaphtherin may be applied in the form of the powder itself or in solutions of from $\frac{1}{10}$ to 1 per cent.

DIGITALIN.[1]

Digitalin is supposed to be one of the four or five glucosides (?) existing in the common foxglove (*Digitalis purpurea*). Its true chemical nature has not been determined.

Physical Properties.—Digitalin occurs as an amorphous crystalline powder.

Therapeutic Applications.—This remedy is employed in those cardiac diseases in which digitalis itself is indicated.

Administration.—The dose of digitalin is from $\frac{1}{100}$ to $\frac{1}{50}$ of a grain (0.0006 to 0.0013 gramme).

DISINFECTIN.

This name is given to a combination composed of 5 parts of the residue left over in the distillation of crude naphtha and 1 part by volume of concentrated sulphuric acid. This mixture is allowed to cool, and the fluid portion is finally and gradually combined with an equal volume of 10 per cent. soda solution and well shaken. The mixture appears as a yellowish-brown emulsion. When used as a disinfectant, *disinfectin* must be diluted with four parts of hot water.

DISINFECTOL.

This is a mixture of hydrocarbons, soaps, carbolic acid, and soda.

Physical Properties.—*Disinfectol* occurs as a brownish-black oily liquid analogous to creolin and lysol. It has an alkaline reaction and a sp. gr. of 1.086.

[1] Two other glucosidal principles have been described of late—*digitalein* and *digitoxin*. Digitalein, whose formula is $C_5H_8O_5$, occurs as a yellowish amorphous powder, freely soluble in water and alcohol. Digitoxin is said to have a composition of $C_{21}H_{32}O_7$, and is a white crystalline body, of a bitter taste, readily soluble in chloroform, but insoluble in water. The dose of this principle is put down as from $\frac{1}{200}$ to $\frac{1}{100}$ of a grain (0.0003 to 0.0006 gramme) twice a day. This drug has been highly recommended as a substitute for digitalis in cardiac disease, being said to act especially upon the left ventricle.

Therapeutic Applications.—This remedy is claimed to possess energetic disinfectant properties, but it has had no very extensive use.

Administration.—Disinfectol has been employed locally in the form of emulsion of a strength of from 2 to 5 per cent.

DIURETIN.

The *sodio-salicylate of theobromine* or the *salicylate of theobromine and sodium* is designated by the name of *diuretin*. This combination, which is supposed to contain 49.7 per cent. of theobromine and 38.1 per cent. of salicylic acid, is represented by the formula $C_7H_7N_4O_2$-Na,C_6H_4OHCO-ONa.

Physical Properties.—This salt appears as a white powder.

Solubility.—This compound is soluble in hot water and in warm alcohol, but is insoluble in chloroform and ether.

Physiological Action.—The chief action of this double salt is that of a diuretic, stimulating directly, it is claimed, the secreting epithelium of the kidney.

Therapeutic Applications.—Diuretin is employed extensively as a diuretic, especially in dropsies of cardiac origin. Its effects are said to have been satisfactory in most instances.

Administration.—This drug is best given in pill form, but may likewise be administered in powder dissolved in peppermint-water. The dose is 15 grains (1 gramme) five or six times a day.

DUBOISINE.

The alkaloidal principle yielded by *Duboisia myoporoides*: it is obtained from the leaves of the plant, and is represented by the formula $C_{17}H_{23}NO_3$.

Therapeutic Applications.—The *sulphate of duboisine*, the salt generally used in practical medicine, has of late been employed not only as a mydriatic in place of atropine, but also, with asserted success, as a sedative and hyp-

notic in a variety of nervous disorders. Its great value in mental disease has been determined by recent trials; in such cases the drug has been found superior to atropine and morphine.

Administration.—The dose of this salt varies from $\frac{1}{120}$ to $\frac{1}{60}$ of a grain (0.00054 to 0.001 gramme), and it may be given in amounts as high as $\frac{1}{30}$ of a grain (0.002 gramme).

Toxicology.—Even when locally applied to the eye, duboisine is apt to cause toxic symptoms consisting of disturbance of speech, a frequent pulse, great weakness, and a rise of the bodily temperature. Among the first of the untoward effects produced by the drug may be mentioned dryness of the throat.

DULCIN.

This new sweetening agent is the *paraphenotol carbamide*. It is known also under the name of *sucrol*.

Physical Properties.—With fuming nitric acid *dulcin* will produce a beautiful orange-yellow substance. On evaporating, sucrol will yield an orange-yellow residue; this residue, treated with two drops each of liquid carbonic acid and concentrated sulphuric acid, will give an intense blood-red coloration.

Physiological Action.—Given to rabbits in daily doses of 30 grains (2 grammes), it exercises no deleterious influence. The same results have been observed in the case of dogs, and from experiments it has been determined that in these latter animals daily amounts of 1½ grains (0.09 gramme) per kilo (2⅕ pounds) of the body-weight produce no injurious effects.

Therapeutic Applications.—Dulcin has been employed with apparent success in the treatment of diabetes. The drug is said to be well borne.

Administration.—Dulcin can be given in doses of $\frac{2}{3}$ of a grain (0.02 gramme) twice a day in the form of pastilles. These may be employed for the purpose of sweetening coffee or tea.

ELDER.

This plant is the *Sambucus nigra*, whose chemical nature has not been fully determined.

Therapeutic Applications.—This drug is a valuable diuretic. It has been successfully tried in ascites and anasarca, especially of cardiac and renal origin.

Administration.—Elder is best given in the form of a decoction.

EMOL.

This substance is a kind of earth said to contain steatite and traces of lime and oxide of iron. When pure it occurs as an impalpable powder with a delicate pink color. It is said to exert a softening influence upon the hard water of limestone districts.

Therapeutic Applications.—When used with warm water emol is asserted to act as a natural soap. This peculiar effect suggested its use as a vulnerary in the treatment of horny accretions of the hands and feet. In the form of a paste emol has apparently given good results in removing epidermal masses, as well as the horny epidermis observed in cases of eczema of the palm and sole. This peculiar earth is believed also to possess antipruritic virtues.

EPHEDRINE.

An alkaloidal principle obtained from the leaves of *Ephedra vulgaris*.

Physical Properties.—The alkaloid occurs in colorless crystals, and the *hydrochlorate* in colorless needles.

Solubility.—This salt is soluble in water.

Therapeutic Applications.—*Ephedrine hydrochlorate* is now solely used as a mydriatic in place of atropine.

Administration.—This salt is applied from solutions of a strength varying from 1 to 10 per cent.

ESERIDINE.

This alkaloid is extracted from the seeds of the common Calabar bean (*Physostigma venenosum*). It must

not be confounded with *eserine* or *physostigmine*, which also occurs in the same plant. *Eseridine* has the formula $C_{15}H_{23}N_3O_3$.

Physical Properties.—The melting-point of eseridine is 269.6° F. (132° C.), thus differing from its sister alkaloid, eserine, which melts at 194° F. (90° C.).

Solubility.—The alkaloid *eseridine* dissolves in ether with difficulty.

Therapeutic Applications.—This drug has been recommended so far only in veterinary therapeutics as a purgative for herbivorous animals.

ETHIDENE DICHLORIDE.

This drug is also termed *monochlorethyl chloride*, with a formula of $C_2H_4Cl_2$.

Therapeutic Applications.—This drug is now used occasionally as an anæsthetic, but it has not been thoroughly studied.

ETHYL BROMIDE.

Bromide of ethyl, which is also known under various other names, such as *ætherbromatus*, *brom-ethyl*, *hydrobromic ether*, and *monobromethane*, has the formula C_2H_5Br.

Physical Properties.—*Ethyl bromide* is a colorless inflammable liquid with a burning taste and a sweet odor resembling that of chloroform. When pure it boils at from 100.4° to 102.2° F. (38° to 39° C.), and its sp. gr. at 59° F. (15° C.) varies from 1.419 to 1.420.

Solubility.—Bromide of ethyl is readily soluble in alcohol, ether, and chloroform, but is insoluble in water.

Physiological Action.—The dominant action of this drug is that of a general anæsthetic.

Circulation.—The *blood-pressure* is not affected by small doses; it is lowered and then elevated by larger amounts, owing to changes in the respiration; it is finally diminished from paralysis of vaso-motor and cardiac origin. The *pulse* is at first accelerated, due to stimula-

tion of the automatic cardiac centres; the slowing which follows depends on a diminished irritability of the cardiac muscle. This drug has no effect apparently on the vagi, the cardio-dilator centres, or the peripheral vaso-dilator nerves.

Respiration.—Action uncertain, but bromide of ethyl usually kills by respiratory failure.

Therapeutic Applications.—This drug is employed as an anæsthetic for cases of minor surgery. The anæsthesia produced by the drug is prompt, being effected in the course of from a half to one minute, but soon passes off after the removal of the remedy. Ethyl bromide is therefore inferior, from a practical point of view, to chloroform, but is often preferable to the latter agent.

Administration.—The dose of bromide of ethyl is from 3 to 6 drachms (11.25 to 22.50 grammes), administered by inhalation.

Toxicology.—Nausea and vomiting sometimes follow the administration of ethyl bromide. An unpleasant garlic-like odor of the breath and a similar taste in the mouth often remain for several days after the use of the drug. Bromide of ethyl is apt to produce nervous twitchings and even tetanic spasms. It has caused death.

ETHYL CHLORIDE.

This new anæsthetic is said to be produced by the action of hydrochloric acid upon alcohol. It is represented by the formula C_2H_5Cl.

Physical Properties.—This drug occurs as a colorless, inflammable, volatile liquid of a not unpleasant odor. It boils between 50° and 53° F. (10° to 12° C.) and burns with a green flame.

Physiological Action.—This drug acts as a fugacious general anæsthetic. The anæsthesia produced by it, however, is usually accompanied by a fall of the arterial pressure and a decrease in heart-beat, due probably to a direct cardiac action. It increases at first both the rate and depth of the respiratory movements, followed

by a depressant effect on the same, the function often stopping suddenly. The amount necessary to produce local anæsthesia is not sufficient, as a rule, to influence the general system.

Therapeutic Applications.—At present the remedy is employed only as a local anæsthetic in dental practice and for minor surgical operations.

Administration.—*Chloride of ethyl* is administered generally in the form of a spray.

ETHYL IODIDE.

This body, which is a hydriodic ether, may be represented by the formula C_2H_5I.

Solubility.—The *iodide of ethyl* is soluble in alcohol and ether, and slightly so in water.

Therapeutic Applications.—This drug has recently been found to be effective in the treatment of asthma and laryngitis, especially in the subacute and chronic catarrh of the ear-passages. It has been recommended also in the treatment of the latter stages of pneumonia, to enhance resolution.

Administration.—*Ethyl iodide* can best be administered by inhalation.

ETHYLENE BROMIDE.

This substance is also named *dibromethane*, its chemical constitution being $C_4H_2Br_2$.

Physical Properties.—*Ethylene bromide* occurs as a brownish emulsifiable liquid with an odor resembling that of chloroform and with a sweetish taste. Its sp. gr. is 2.163 at 69.8° F. (21° C.). It solidifies at 32° F. (0° C.), and its boiling-point is 299.8° F. (131° C.).

Solubility.—This drug is soluble in alcohol, but insoluble in water.

Therapeutic Applications.—Ethylene bromide, unlike the ethyl bromide, with which it must *not* be confounded, is not used as an anæsthetic. The ethylene compound

is said to be of value in the treatment of epilepsy, and is employed in place of the potassium salt.

Administration.—This remedy is best given in emulsion or capsules, in doses of 6 to 12 drops or minims (0.18 to 0.74 gramme) three times a day; for a child ten years of age, 10 drops (0.60 gramme) twice a day, increasing cautiously. This remedy may be given hypodermatically.

EUCALYPTEOL.

This new body has been obtained from the oil of eucalyptus by means of hydrochloric acid. It is chemically the *hydrochlorate of eucalyptene*.

Physical Properties.—Eucalypteol is a white, micaceous, scaly substance having an aromatic camphor-like odor and a peculiar feeble but persistent taste. Its melting-point is at 122° F. (50° C.).

Solubility.—*Eucalyptene hydrochlorate* is soluble in alcohol, chloroform, ether, fatty and volatile oils, and petroleum; it is scarcely soluble in water.

Physiological Action.—Eucalypteol is said to be non-poisonous and to be borne well by the stomach. It is largely eliminated by the bronchial and salivary secretions, the urine, and the intestinal secretions, in all of which its presence is shown by a peculiar faint but appreciable aroma.

Therapeutic Applications.—This new drug has given excellent results in acute and chronic bronchitis, as well as in other diseases of the lungs. As a gastro-intestinal disinfectant it has rendered great service in typhoid fever, diarrhœa, green stools, and in other similar disorders.

Administration.—Eucalypteol is best administered in capsules or in wafers. For adults the daily dose, in divided quantities and best given between meals, may be set down as 22½ grains (1.5 grammes). To children the remedy is best administered as a confection with water or milk. For children under one year the daily dose prescribed may be 3¾ grains (0.25 gramme); for those of from four to five years, 4½ to 7½ grains (0.30 to 0.50

gramme); and for those over five years, 7½ to 11¼ grains (0.50 to 0.75 gramme).

EUCALYPTOL.

This substance is obtained from the essential oil of several plants of the *Eucalyptus* genus, and also from other plants. The formula given for eucalyptol is $C_{10}H_{18}O$.

Physical Properties.—This body, when pure, occurs as a colorless liquid with an odor resembling that of camphor. It boils at from 348.8° to 350.6° F. (176° to 177° C.), and its sp. gr. is 0.930. It crystallizes at 30.2° F. (—1° C.).

Solubility.—Eucalyptol is soluble in alcohol, ether, chloroform, and the fatty oils; it is insoluble in water.

Therapeutic Applications.—This drug possesses marked therapeutic properties, but is chiefly employed externally as an antiseptic in ulcers and as a stimulant in neuralgia and rheumatism. Internally, it has been of advantage in diseases of the respiratory tract, such as pneumonia, pulmonary gangrene, and tuberculosis. It has done good in malaria, affections of the urinary tract, and influenza.

Administration.—Eucalyptol is best given in capsules or in emulsion internally, or hypodermatically in oil, in doses of 5 minims (0.30 gramme).

EUCALYPTUS ROSTRATA.

This plant occurs upon the market in the form of *red gum.*

Therapeutic Applications.—This drug is highly recommended in the treatment of seasickness.

Administration.—This medicament is best administered in lozenges, in doses of 1 grain (0.06 gramme) three or four times a day.

EUGENOL.

This body, a phenol which is yielded by the oil of cloves through oxidation, may be obtained also from

other essential oils, such as that of cinnamon, bay, pimento, and sassafras. *Eugenol* is also termed *eugenic acid*, and is thus chemically constituted: $C_6H_3.C_3H_5.(OH)(OCH_3)$.

Physical Properties.—Eugenol occurs as an aromatic liquid with a boiling-point of 455° F. (235° C.).

Solubility.—This drug is freely soluble in alcohol, but only slightly soluble in water.

Therapeutic Applications.—Although recommended as a febrifuge, this remedy is at present mainly employed as an antiseptic;[1] as such it has rendered good service, being considered in many instances superior to carbolic acid.

Administration.—The daily dose of *eugenol*, which can be best administered in alcoholic solutions, is 45 minims (2.80 grammes).

EUONYMIN.

This drug is obtained from the bark and root of *Euonymus atropurpureus;* its chemical constitution has not been definitely made out.

Physical Properties.—*Euonymin* is a brown or greenish-brown resinous powder having a slightly bitter taste.

Solubility.—This drug is soluble in water, but scarcely so in alcohol and ether.

Therapeutic Applications.—Euonymin is of service as a laxative in constipation of hepatic origin due especially to a torpid organ.

Administration.—The dose of euonymin is from ½ to 3 grains (0.03 to 0.18 gramme).

EUPHORBIA PILULIFERA.

Physiological Action.—This drug, in full doses, acts especially as a depressant of the circulation and the res-

[1] Besides the *benzoyl-eugenol* (*q. v.*) another derivative of eugenol is the *cinnamyl-eugenol*, with a formula of $C_6H_3.C_3H_5(OCH_3.CO_2.CH_2.C_6H_5$, which occurs in colorless crystals, odorless and tasteless, having a boiling-point of 194° to 198.5° F. (90° to 91° C.). *Cinnamyl-eugenol*, like its co-derivative, is soluble in hot alcohol, ether, chloroform, and acetone. This drug is being used in the treatment of tubercular diseases.

piration, though it is said to also cause irritation of the stomach.

Therapeutic Applications.—This plant has recently been found of value in the treatment of coryza and hay asthma, and has been recommended in emphysema and chronic bronchitis. It has been lauded in the treatment of chronic asthma.

Administration.—The preparation used is the fluid extract, the dose of which is given as from 30 to 60 minims (2 to 4 grammes).

Contraindications.—This drug is said to be contraindicated in diseases of the kidney. It is believed that the coloring matter of the plant affects the renal secretions in one way or another, and hence this drug should not be used in kidney troubles except with great caution.

EUPHORIN.

This body is the *carbonate of ethyl and phenyl, phenylethylic urethane*, or simply *phenyl urethane*, having a formula of $CO\begin{cases} O,C_2H_5 \\ NH,C_6H_5 \end{cases}$ or $C_6H_5NHCOOC_2H_5$.

Physical Properties.—*Euphorin* occurs as a white powder having a slight aromatic odor and a taste resembling that of cloves. Its melting-point is 123.8° F. (51° C.).

Solubility.—This drug is soluble in alcohol, but only slightly soluble in water.

Therapeutic Applications.—Euphorin is recommended as a serviceable antipyretic, antirheumatic, anodyne, and antiseptic in those affections requiring the actions of such drugs. Thus, it has been employed with asserted success in rheumatism, tuberculosis, venereal and other skin disorders, etc. As an antipyretic it has been tried with success in typhoid fever, appearing to act better when the fever is at its maximum. The defervescence that follows its ingestion is attended with a feeling of warmth and moderate sweating. This drug can be employed in surgical fevers. Its analgesic powers

have been tested with satisfactory results in neuralgia not due to a specific cause, and also in wounds and ulcers. The drug is claimed to be one of the most effective disinfectants in thrush.

Administration.—Euphorin may be given in doses of from 7½ to 15 grains (0.5 to 1 gramme) twice or thrice a day. It can be employed in the pure state as a dusting-powder, and also in the form of an ointment with vaselin or lanolin.

Toxicology.—Euphorin causes no alarming secondary effects; cyanosis is sometimes produced by the drug, but never symptoms of collapse.

EUROPHEN.

Europhen, which must *not* be confounded with *euphorin* (*q. v.*), is the *iodo-di-iso-butyl-ortho-cresol* or *di-iso-butyl-ortho-iodide*, said to contain 21.8 per cent. of iodine. It is chemically constituted as follows: $2\left(\begin{matrix}C_4H_9\\CH_3\end{matrix}\right\rangle C_6H_3O)III.$

Physical Properties.—This drug occurs as an amorphous powder having a yellowish color and an odor resembling that of saffron. It melts at 158° F. (70° C.) and liquefies at 230° F. (110° C.), the liquid appearing of a clear brown color.

Solubility.—Europhen is soluble in alcohol, ether, chloroform, and the oils, but is insoluble in water.

Incompatibility.—This drug is incompatible with mercurial preparations and with metallic oxides, as well as with starch and zinc.

Therapeutic Applications.—This remedy is used in all those diseases for which iodoform is employed; over this latter substance europhen has some advantages. It has been found serviceable in lupus, ulcers of the leg, and scrofuloderma. Hypodermatically administered, europhen is said to be beneficial in the treatment of syphilitic disorders.

Administration.—This drug is applied as a dusting-powder or in ointment of the strength of from 5 to 10

per cent. For hypodermatic use solutions in olive oil of from 3 to 10 per cent. strength may be employed, the dose being from ¼ to 1½ grains (0.016 to 0.09 gramme).

EXALGIN.

This compound, which is the *methyl-acetanilid*, a substance closely allied to acetanilid or antifebrin, is obtained by the interaction of acetyl chloride and monomethyl-anilid. *Exalgin* is represented by the formula C_6H_5-N-$(CH_3)CH_3CO$.

Physical Properties.—Methyl-acetanilid occurs as a tasteless powder made up of crystalline acicular needles with a melting-point of 212° F. (100° C.), and, without decomposing, it boils at from 464° to 482° F. (240° to 250° C.).

Solubility.—Exalgin is readily soluble in alcohol and difficultly soluble in water.

Incompatibility.—This drug is incompatible with salicylic acid, but, singularly enough, it is not so with the salicylate of sodium.

Physiological Action.—*Nervous System.*—Exalgin acts chiefly on the cerebro-spinal axis. It diminishes motor power and causes clonic convulsions of cerebral origin.

Circulation.—Methyl-acetanilid is a cardiac depressant, and, interfering with oxygenation of the blood, diminishes oxyhæmoglobin. Small doses increase the arterial pressure.

Respiration.—Sufficiently large doses depress this function, and death is usually caused by respiratory failure.

Muscular System.—Intramuscular injections produce local paralysis of this tissue.

Temperature.—This medicament reduces the bodily temperature, but apparently has little or no action on heat-production.

Therapeutic Applications.—This drug has been employed particularly as an analgesic and antiseptic. It is

of service in a large class of neuralgias, in which it has been found superior to antipyrin. Exalgin has given relief in chorea, in the pains of locomotor ataxia, in lumbago, and in muscular rheumatism. This drug has been effective in controlling the tremors of paralysis agitans.

Administration.—Exalgin is best administered in cachets or capsules or in weak alcoholic solutions. The dose may be put down as from $\frac{4}{5}$ of a grain to 2 or even 5 grains (0.05 to 0.12 or 0.6 gramme).

Toxicology.—Among the toxic symptoms caused by exalgin may be mentioned vertigo, sometimes accompanied with chilly sensations and vomiting; tingling of the tongue and the extremities; cephalalgia, drowsiness, or simply heaviness of the head; cyanosis; and general and profuse sweating with evident approaching collapse.

FLUORESCEIN.[1]

This body is a derivative of resorcin, and is likewise named *resorcin-phtalein*. Its chemical composition is $C_{20}H_{12}O_5$.

Physical Properties.—This drug is a dark-brown crystalline substance. It forms with ammonia a red solution which gives a most beautiful green fluorescence.

Therapeutic Applications.—*Fluorescein* is highly recommended, chiefly for the detection of lesions of the cornea, especially in cases in which there is much photophobia. It has also been found of value in determining whether strictures of the nasal duct are impervious. This drug is used in solutions of the strength of 10 grains to the ounce (0.65 in 30 grammes), adding to this about 1½ times as much of bicarbonate of sodium.

FORMALIN.

The name *formalin* or *formol* is given to a 40 per cent. solution of the gas *formal-aldehyd* (HCOH) in water.

[1] *Fluorescin* is another body closely allied to fluorescein, and is used for the same purposes.

This drug is known also under the appellation of *formic aldehyd.*

Physical Properties.—This agent occurs as a colorless liquid with a pungent odor.

Therapeutic Applications.—This drug is highly spoken of as a general antiseptic, being considered as effective as corrosive sublimate. It is recommended as a sterilizer for surgical dressings, with the advantage that it does not affect the color or the texture of the various materials. As a disinfectant, for employment in hospital wards infested with contagious disease, it is likewise highly recommended, as it will not prove poisonous to patients. For this purpose the evolution of the gas is effected by heating the solution. For antiseptic uses formalin can be employed in the strength of 1 : 40 or in 1 per cent. solution of the gas. This drug is also well spoken of in the treatment of excrescences of the skin and mucous membranes, since in strong solutions it causes necrosis of the tissues without producing suppuration. Experiments seem to show that all microorganisms are destroyed in the course of fifteen minutes in an atmosphere containing 2½ per cent. (vol.) of formalin.

FORMANILID.

This substance, known also under the name of *phenylformamid*, is made by heating anilin with ethyl formate or with oxalic acid. It is represented by the formula C_6H_5-NH.CHO.

Physical Properties.—This drug occurs in the form of prisms having a melting-point of 114.8° F. (46° C.).

Solubility.—Formanilid is readily soluble in water, alcohol, and ether.

Physiological Action.—This medicament is said to act as an analgesic, antipyretic, and hæmostatic. The analgesia produced is followed by complete loss of reflex action, and lasts from ten to twelve hours. Dropped on the tongue, it causes a pungent sensation followed by

pallor, dulness, and analgesia of the mucous membrane.

Therapeutic Applications.—Phenyl-formamid has recently been employed for its anæsthetic properties in laryngeal disease. As a hæmostatic it has given satisfactory results in painful affections like tonsillitis, pharyngitis, etc. This drug has been advantageously tried as a general anæsthetic in surgical operations. As an antirheumatic and antipyretic it is claimed to be as effective as antipyrin or acetanilid.

Administration.—This remedy may be employed by insufflation. For subcutaneous injections 16 minims (1 cc.) of a 3 per cent. solution have produced the desired anæsthetic effect.

Toxicology.—Formanilid is apt to cause a sensation of depression and cardiac palpitations.

FUCHSINE.

The *monohydrochlorate of rosaniline* is known under the names *fuchsine* and *roseine*.

Therapeutic Applications.—This substance, soluble in water, is said to be a valuable remedy in albuminuria and in the treatment of typhus fever. Care must be exercised in its use, as it is liable to contain arsenic.

Administration.—Fuchsine is best given in pill form with glycerin or tragacanth, in doses of from ½ to 4 grains (0.3 to 0.25 gramme).

GALEGA.

Therapeutic Applications.—Although not as yet thoroughly studied chemically or physiologically, this plant has been found to possess highly valuable galactagogue properties. These virtues have been put to practical use with excellent results. An aqueous extract is the preparation employed, in doses of from 7½ to 15 grains (0.5 to 1 gramme). As high a quantity as 60 grains (4 grammes) has been administered in the course of a day.

GALLACETOPHENONE.

This body, originally known as *gallacotophenone*, is a derivative of pyrogallol with a formula of $CH_3CO,C_6H_2(OH)_3$.

Physical Properties.—This drug is a yellowish crystallizable powder with a melting-point of 158° F. (70° C.).

Solubility.—*Gallacetophenone* is soluble in hot water, alcohol, ether, and glycerin.

Therapeutic Applications.—This remedy is chiefly employed as a substitute for pyrogallol in diseases of the skin, especially psoriasis.

Administration.—Gallacetophenone is applied locally in 10 per cent. solutions.

GALLANOL.

This new dermic substance is obtained by heating gallic acid and anilin and treating the product with water acidulated with hydrochloric acid.

Physical Properties.—*Gallanol* occurs in the form of a white crystalline body having a slightly bitter taste; it melts, without decomposition, at 401° F. (205° C.). With alkalies this drug gives a brown coloration.

Solubility.—This remedy is quite soluble in boiling water, in alcohol, and in ether, only slightly soluble in cold water, and insoluble in benzene and chloroform.

Therapeutic Applications.—Gallanol has been used with alleged advantage in diseases of the skin, particularly in eczema and psoriasis, locally applied.

Administration.—This remedy can be employed in solution of the strength of 10 per cent., or in ointment, especially with petroleum, in the strength of from 10 to 25 per cent.

GALLOBROMOL.

The above name is given to *dibromogallic acid*, which is simply gallic acid in which two atoms of hydrogen have been replaced by two atoms of bromine. The formula of *gallobromol* therefore is $C_6Br_2(OH)_3CO.OH$.

Physical Properties.—This drug appears in the form of delicate white needles.

Solubility.—Dibromogallic acid is readily soluble in boiling water, alcohol, and ether; less so in cold water.

Physiological Action.—It is claimed that the action of gallobromol is not as depressing as that of the bromide of potassium. This new remedy gives to the urine a roseate or a slightly brown color.

Therapeutic Applications.—Gallobromol has been found to be quite efficient in the treatment of various nervous disorders. It has apparently given good results in epilepsy, but in this disease it is not so valuable as the bromide salt.

Administration.—This drug may be administered in cachets in doses of from 7½ grains (0.50 gramme) up to 2 or 2½ drachms (8 to 10 grammes).

Toxicology.—Gallobromol is apt to cause heaviness and even pain over the gastric region, but no more serious untoward symptoms have been noticed.

GELSEMINE.

An alkaloid extracted from the rhizome of two species of the yellow jasmine, *Gelsemium sempervirens* and *Gelsemium nitidum*. Its formula is $C_{51}H_{60}N_4O_{12}$.

Physical Properties.—*Gelsemine* occurs as a solid, transparent, crystallizable mass. It is turned into a colorless liquid at 113° F. (45° C.).

Solubility.—This alkaloid is insoluble in cold water, but to a certain extent soluble in hot water, from which it separates in an amorphous mass.

Physiological Action.—To the presence of this alkaloid the action of the plant is due.

Nervous System.—This drug is a paralyzant to the cord. It acts particularly on the motor nerve-fibres and the muscles of the head.

Circulation.—Gelsemine depresses the circulation and is a poison to the heart.

Respiration.—This alkaloid depresses this function by acting directly on the respiratory centres.

Temperature.—Large doses lower the temperature very decidedly.

Pupil.—This drug dilates the pupil by paralysis of the oculo-motor fibres.

Therapeutic Applications.—This drug is useful as an antispasmodic and analgesic in the treatment of convulsive coughs and neuralgias.

Administration.—Doses of gelsemine vary from $\frac{1}{60}$ to $\frac{1}{20}$ of a grain (0.001 to 0.003 gramme).

Toxicology.—Among the bad symptoms produced by this drug may be mentioned the following: dropping of the jaw; ptosis; languor; drowsiness; great muscular relaxation; feeble and rapid pulse; moist and cold skin; anxious face; loss of voice; slow and labored respiration; impaired sensibility; disturbed vision, which is sometimes double; dilated pupil; and great fall of bodily temperature. The treatment in poisoning is general stimulation with the application of emetics. Ammonia, digitalis, and strychnia, together with the application of external heat, may be used.

GLUTIN-PEPTONE SUBLIMATE.

This is a hydrochlorated *glutino-peptonate of mercury* containing 25 per cent. of corrosive sublimate. It is obtained by the action of hydrochloric acid on gelatin.

Physical Properties.—This compound is a white hygroscopic powder, but it generally occurs as a colorless non-corrosive liquid.

Therapeutic Applications.—This remedy is chiefly employed as an antisyphilitic.

Administration.—The *glutin-peptone sublimate* is best administered hypodermatically (it does not produce much pain or form abscesses) in doses of 15 grains (1 gramme).

GUAIACOL.

Guaiacol is designated also by the name *methylpyrocatechin*. It is obtained from beechwood tar creosote, and it is said to contain from 60 to 90 per cent. of creosote. Its formula is $C_6H_4OHOCH_3$.

Physical Properties.—This drug occurs as a liquid substance having a pleasant odor. It boils at from 402.8° to 404.6° F. (206° to 207° C.), and its sp. gr. at 59° F. (15° C.) is 1.133.

Solubility.—*Guaiacol* is soluble in water in the proportion of 1 to 85, and in petroleum benzene in the proportion of 1 to 8.

Therapeutic Applications.—At present guaicol is extensively used in the treatment of tuberculosis, especially during the early stages of the disease, as an advantageous substitute for creosote. In tubercular and in other febrile disorders the drug has done good even when locally applied. Thus used, its antipyretic effects have been decided.

Administration.—This medicament is best given after meals, in alcoholic solutions, mixed with cod-liver oil, or in capsules, in doses of from 5 to 10 minims (0.30 to 0.60 gramme). It may be administered also in the same amounts by inhalation or hypodermatically. Locally, the dose may be put down as about 30 minims (2 grammes), which must be rubbed in slowly.[1]

[1] *Oleo-creosote* is composed of oleic acid and creosote, and is prepared with the aid of phosphorus trichloride. It occurs as a yellowish liquid having a creosote-like taste. It is readily soluble in absolute alcohol, sparingly so in 90 per cent. alcohol, and insoluble in water. It contains 33 per cent. of creosote, and is miscible in all proportions with fatty oils, ether, benzene, carbon bisulphide, chloroform, and oil of turpentine. Oleo-creosote is said to be decomposed in the intestines by the alkalies, and appears to be non-poisonous when given by the stomach, and even when administered hypodermatically, in doses in which either creosote or guaiacol would prove deleterious. *Oleo-guaiacol* is a substance prepared in a manner similar to that of the oleo-creosote, and is also recommended as a therapeutic agent of value.

GUAIACOL BIIODIDE.

Obtained from sodium-guaiacol by the action of iodine and iodide of potassium.

Physical Properties.—This body appears as a reddish-brown salt with an odor resembling that of iodine.

Solubility.—This drug is soluble in alcohol and the fatty oils, but decomposes rapidly.

Therapeutic Applications.—This salt has the same uses as guaiacol itself, and is given in similar doses.

GUAIACOL CARBONATE.

This body has not been definitely determined from a chemical standpoint, although the formula of it is given as $CO(OC_6H_4OCH_3)_2$.

Physical Properties.—*Guaiacol carbonate* occurs as an odorless and tasteless neutral crystalline substance with a melting-point of from 186.8° to 194° F. (86° to 90° C.).

Therapeutic Applications.—The *carbonate of guaiacol* has mainly been employed as a succedaneum for guaiacol and creosote in the treatment of pulmonary tuberculosis. This drug has decided antiseptic properties. When taken into the system it is said to be decomposed by the alkalies into guaiacol and carbonic acid; hence its value in preventing the development of germs.

Administration.—The dose of this remedy is from 6 to 8 grains, and as high even as 1½ drachms (0.46 to 0.52 or 5.8 grammes). It may be increased to 90 grains (6 grammes).

GUAIACOL SALICYLATE.

This new salt of guaiacol, or *guaiacolic salol*, is represented by the formula $C_6H_4\begin{cases}COO.CH_4OCH_3\\OH.\end{cases}$

Physical Properties.—The *salicylate of guaiacol* occurs in white odorless crystals having a melting-point of 149° F. (65° C.).

Solubility.—This salt is soluble in alcohol, but is insoluble in water.

Therapeutic Applications.—*Guaiacol salicylate* is used for the same purpose and in the same quantities as salol.

GURJUN BALSAM.

Gurjun balsam or *oil*, or *wood-oil*, is an exudation obtained from an East-India tree by incision. The chemical nature of the balsam has not been established.

Physical Properties.—The balsam is a transparent liquid of the consistency of olive oil, having a greenish-gray color and an odor resembling that of copaiba.

Therapeutic Applications.—*Gurjun oil* is employed especially as an alterative in the treatment of leprosy. It is said to be serviceable in bronchitis and in gonorrhœa.

Administration.—This remedy is best given in emulsion, combined with sweet spirit of nitre, in doses of 1 to 2 drachms (3.75 to 7.50 grammes) three times a day.

GYNOCARDIC ACID.

From the oil of the seeds of *Gynocardia odorata* is extracted an active principle, called *gynocardic acid*, which is represented by the formula $C_{11}H_{24}O_2$.

Physical Properties.—Gynocardic acid occurs as a yellowish oily substance with a melting-point of 86° F. (30° C.) and having a distinct odor and an acrid taste.

Therapeutic Applications.—This drug is used externally and internally in the treatment of syphilis and leprosy, and even in rheumatic affections. In this respect it is said to be superior to chaulmoogra oil.

Administration.—The dose of gynocardic acid varies from ½ to 3 grains (0.03 to 0.18 gramme). Externally, it may be used in the form of liniment of the strength of 1 to 10 or 20 parts.

HÆMALBUMIN.

Hæmalbumin is the name given to a recent preparation said to contain all the albuminoids and salts of the blood.

Physical Properties.—This agent occurs in the form of a stable powder easily soluble in water and in alcohol.

Therapeutic Applications.—This remedy has been used with asserted success in chlorosis and in general debility, in doses of 15 grains (1 gramme) three to five times a day.

HÆMOGALLOL.

This compound is obtained by the action of pyrogallol on the coloring matter of the blood.

Physical Properties.—This drug occurs as a beautiful reddish-brown powder.

Therapeutic Applications.—The uses and doses of *hæmogallol* are the same as those of hemol (*q. v.*). It has given excellent results in cases of anæmic neurasthenia and in the anæmia of dyspepsia or affections of the heart.

HÆMOGLOBIN.

This is the red coloring principle of the solid elements of the blood.[1]

Therapeutic Applications.—This body has of late been tried with asserted success in the treatment of anæmia and chlorosis. It appears to influence rapidly the size, number, and quality of the blood-corpuscles, producing at the same time an increase in the appetite.

Administration.—*Hæmoglobin* is best given in wine or tablets, in daily doses of from 1½ to 3 grains (0.09 to 0.18 gramme).

HAMAMELIS.

The chemical nature of *Hamamelis virginica*, commonly called *witch hazel*, has not been thoroughly studied.

Therapeutic Applications.—This drug is a valuable hæmostatic, and has been successfully employed in the treatment of hæmatemesis, hæmoptysis, and hæmaturia. It has recently been found serviceable in hemorrhoids, locally applied.

Administration.—The preparation now used is the

[1] Chemical analysis of the *hæmoglobin* of the dog has shown that this principle is made up of $C_{636}H_{1025}N_{164}FeS_3O_{181}$.

fluid extract, the dose of which is from 5 to 20 minims (0.3 to 1.2 gramme).

HELENIN.

This body is obtained from the root of *Inula helenium*. It is represented by the formula C_6H_8O.

Physical Properties.—*Helenin* occurs in colorless crystalline needles having a melting-point of 230° F. (110° C.).

Solubility.—This medicament is readily soluble in hot alcohol, ether, and the oils; scarcely soluble in water.

Therapeutic Applications.—This drug has been used as an antiseptic and antispasmodic in whooping-cough. It has also rendered good service in the treatment of the diarrhœa of phthisical patients. It has likewise given favorable results in the treatment of leucorrhœa accompanied with catarrhal endometritis.

Administration.—*Helenin* is administered, alone or in combination with *inulin*, in doses of from $\frac{1}{6}$ to $\frac{1}{3}$ of a grain (0.01 to 0.02 gramme) in the course of twenty-four hours.

HELLEBOREIN.

This substance, a glucoside, is obtained from the rhizome of several species of the *Helleborus* genus. Its chemical composition is thus formulated: $C_{26}H_{44}O_{15}$.

Physical Properties.—This glucoside appears as a crystalline body.

Solubility.—This drug is perfectly soluble in water.

Therapeutic Applications.—*Helleborein* has been employed chiefly as a substitute for digitalis. It also possesses anæsthetic properties said to be superior to those of cocaine.

Administration.—The dose of *helleborein* is from $\frac{1}{10}$ to $\frac{1}{4}$ of a grain (0.006 to 0.016 gramme).

HEMOL.

A compound obtained by the action of zinc-dust on the coloring matter of the blood.

Physical Properties.—*Hemol* appears as a blackish-brown powder.

Therapeutic Applications.—This drug has been found useful as a hematinic, especially in the treatment of chlorosis.

Administration.—Hemol is given in doses of from 1½ to 7½ grains (0.1 to 0.5 gramme) three times a day, in the form of wafers or chocolate tablets.[1]

HOMATROPINE.

This is a by-product occurring in the preparation of atropine, but it has also been synthetically prepared from *tropic acid* and *tropin*, two derivatives of the belladonna alkaloid. The composition of homatropine is $C_{16}H_{21}O_2$.

Physical Properties.—This drug occurs in white crystalline prisms.

Solubility.—*Homatropine* is readily soluble in water.

Therapeutic Applications.—Although there are several salts of this drug, the one most commonly used is the *hydrobromate*. It is employed in those diseases in which atropine is indicated. Homatropine is also a mydriatic, and has been found of service in the night-sweats of phthisis.

Administration.—The dose of *homatropine hydrobromate* is from $\frac{1}{120}$ to $\frac{1}{60}$ of a grain (0.0005 to 0.0010 gramme). For local applications to the eye, solutions of the strength of 4 grains to the ounce (0.25 in 30.00 grammes) may be employed.

[1] Under the name of *ferratin*, two varieties of a fine reddish-brown powder have lately been introduced. Ferratin is reported to be a compound of iron extracted from the hog's liver. The new substance is said to contain 6 per cent. of the metal. The *sodium-ferratin*, one of the powders, is soluble in water; it has been tried with alleged success as a hematinic. It may be administered in daily doses of from 15 to 22½ grains (1 to 1.5 grammes). For children daily amounts of from 1 to 7½ grains (0.06 to 0.50 gramme) may be employed. During the use of ferratin, acid articles of food had better be avoided. A watery solution of the sodium powder mixed with milk is advantageous in the case of children.

HYDRACETIN.

This hydrazin compound, also commonly called *pyrodin*, is the acetyl-phenyl hydrazin, with a formula of $C_6H_5HN\text{-}NHCH_3CO$.

Physical Properties.—Hydracetin occurs as a colorless, odorless, and almost tasteless substance, and is made up of prisms. It boils at from 262.4° to 264.2° F. (128° to 129° C.).

Solubility.—Hydracetin is soluble in alcohol, and in water in the proportion of 1 to 50.

Physiological Action.—This drug acts particularly on the lower nervous system, diminishing reflex activity. Upon the circulation it acts as a depressant; the pulse-rate is lessened and the arterial pressure is lowered by influencing the vaso-motor centres. It is said to exercise a destructive action upon the red blood-corpuscles. Hydracetin diminishes the bodily temperature, this effect being accompanied by marked sweating.

Therapeutic Applications.—This drug has been employed, with little or no beneficial effect, as an antipyretic in such diseases as rheumatism of the joints and tetanus; its chief uses at present are confined to cutaneous disorders, especially psoriasis, in which it is resorted to in the place of chrysarobin. As an antipyretic it must be given with extreme caution.

Administration.—The dose varies from ½ to 3 grains (0.03 to 0.18 gramme). For local applications an ointment of the strength of 10 per cent. may be employed.

Toxicology.—*Pyrodin* is a poisonous substance. It may produce such symptoms as chills, cyanosis, diminished bodily temperature, profuse sweating, and disturbances of respiration and circulation—in fact, all the phenomena of collapse. Anæmia and methæmoglobinuria may also result from the continued use of the drug.

HYDRASTINE.

One of the alkaloids of the common "golden seal" (*Hydrastis canadensis*). This principle has the chemical composition $C_{21}H_{21}NO_6$.

Physical Properties.—This alkaloid is a white crystalline body made up of four-sided rhombic prisms; it also occurs in an amorphous form.

Solubility.—*Hydrastine* is soluble in alcohol, ether, and chloroform, but insoluble in water. The salts, such as the nitrate, the sulphate, the tartrate, and especially the *hydrochlorate*, are all soluble in water.

Physiological Action.—*Local Action.*—Locally applied, hydrastine acts as an anæsthetic.

Nervous System.—Small doses increase reflex action by stimulating the spinal cord; large amounts lessen the same by first stimulating Setschenow's centre and then by paralyzing the cord. This drug causes convulsions of spinal origin; it also destroys the excitability of both motor and sensory nerves.

Muscular System.—This alkaloid at first slightly increases, but afterward diminishes and finally destroys, the excitability of the muscular system, including the cardiac muscle.

Circulation.—It is said that minute doses of hydrastine increase the arterial pressure, but that larger amounts decrease the arterial pressure by an action upon both the heart and the vaso-motor system. This alkaloid in small quantities increases, but in large doses diminishes, the pulse-rate, the result of an action on both the heart-muscle and the cardio-inhibitory centres.

Respiration.—This drug at first increases and afterward diminishes the respiratory movements, and finally kills through failure of the respiration.

Bile.—Hydrastine markedly increases the biliary secretion.

Pupil.—Locally applied, it causes contraction (due to irritation) followed by dilatation of the pupil.

Therapeutic Applications.—Hydrastine is useful in a large variety of disorders as a stomachic and antiperiodic. It is of service also in diseases of the skin, catarrhal jaundice, as a uterine tonic, in leucorrhœa, metrorrhagia, gonorrhœa, gleet, ear troubles, chronic inflammations of the nose, etc. It has been used with alleged advantage in chronic gastro-intestinal catarrhs, particularly those met with in alcohol-drinkers.

Administration.—The dose of hydrastine may be given as from ¼ to ½ grain (0.015 to 0.03 gramme). For gonorrhœa a solution may be used of the strength of from ½ to 1 or 2 grains to the ounce (0.03 to 0.06 or 0.12 in 30.00 grammes). For external use ointments of the strength of from 10 to 60 grains to the ounce (0.65 to 3.9 in 30.00 grammes) are recommended.

Toxicology.—No cases have been reported of serious intoxication traceable to the use of the drug. If poisoning does occur, the symptoms will undoubtedly resemble those produced by strychnine, and they should be treated as such.

HYDRASTININE.

Hydrastinine, which is obtained from hydrastine by a process of oxidation, is thus chemically constituted: $C_{11}H_{13}NO_3$.

Physical Properties.—This drug occurs in acicular crystals with a melting-point of from 240.8° to 242.6° F. (116° to 117° C.).

Solubility.—Hydrastinine is freely soluble in alcohol, ether, and chloroform, and is but slightly soluble in water.

Physiological Action.—The behavior of this substance is identical with that of hydrastine, except that it does not appear to act upon the heart. Hydrastinine elevates the arterial pressure by an action upon the vasomotor centres, and diminishes the pulse-rate by stimulating the cardio-inhibitory centres. This drug kills also through respiratory failure.

Therapeutic Applications.—The salt most generally

employed in practical medicine is the *hydrochloride*. This remedy is of great value in dysmenorrhœa, and is especially serviceable as a hæmostatic in almost all kinds of uterine hemorrhage.

Administration.—The *hydrochloride of hydrastinine* is best administered hypodermatically in doses of from $\frac{1}{12}$ to $\frac{1}{2}$ grain (0.005 to 0.03 gramme).

Toxicology.—Among the untoward effects of this drug there have been noticed dryness of and patches in the throat, difficulty of swallowing, and violent pain in the neck. Some of these symptoms resemble those caused by atropine, and therefore care should be exercised in the use of hydrastinine.

HYDROCHINONE.

This substance is obtained from *arbutin*, the active principle of *Arctostaphylos uva-ursi*, by the action of sulphuric acid, or from anilin by oxidation with chromic acid. *Hydrochinone* is also called *paradioxybenzene*, or commonly *quinol*, and is represented by the formula $C_6H_4(OH)_2$.

Physical Properties.—*Paradioxybenzene* occurs in long, dimorphous, colorless crystals having a melting-point of 336.2° F. (169° C.).

Solubility.—This remedy is freely taken up by hot water, alcohol, and ether; it is soluble in cold water in the proportion of 1 to 20 parts.

Therapeutic Applications.—*Hydrochinone* has been recommended as an internal antiseptic and as an anti-periodic. It has apparently produced good results.

Administration.—The dose of hydrochinone may be put down as from ½ to 5 grains (0.03 to 0.30 gramme).

HYDROGEN PEROXIDE.

An aqueous solution of hydroxyl, having the formula H_2O_2.

Therapeutic Applications.—This remedy is lauded as a powerful general disinfectant and germicide; it has

been tried with success both in medical and in surgical cases.

Administration.—The dose of *peroxide of hydrogen* is given as from ½ to 2 drachms (1.09 to 4.36 grammes). The solution used in practical medicine contains about ten times its volume of active oxygen.

HYDRO-NAPHTHOL.

This substance, although apparently similar to and identical with beta-naphthol, is, however, derived from the latter by the substitution of a molecule of hydroxyl (OH) for an atom of H.

Solubility.—*Hydro-naphthol* is soluble in water in the proportion of from 1 part in 1000 to 1 part in 900 parts.

Therapeutic Applications.—This remedy has quite recently been suggested as useful in the prophylactic treatment of cholera, and even in that of the fully-developed disease. The drug has been proven to be distinctly antiseptic and germicidal, respectively, in the proportion of 1 part to 7000 parts of nutritive culture-medium, and in equal parts of the remedy and a bouillon culture of the cholera bacillus. Hydro-naphthol has been highly recommended in the treatment of simple diarrhœa, dysentery, typhoid fever, an in pulmonary phthisis.

Administration.—This medicament may be administered as a prophylactic against cholera in doses of from 8 to 10 grains (0.5 to 0.6 gramme) three or four times a day for a few days, reducing the amount subsequently. For the other disorders mentioned the drug may be given in quantities of ½ a drachm (1.09 gramme) in the course of the twenty-four hours. Hydro-naphthol is best given in capsules, wafers, emulsion, or keratin-coated pills.

HYDROXYLAMIN.

Obtained by the action of hydrogen upon nitric acid or by the interaction of sodium-hydrogen sulphite in a concentrated solution of sodium nitrate. The *hydroxyl-*

amin hydrochloride is represented by the formula NH_2-OHHCL.

Physical Properties.—This salt appears in colorless crystals resembling those of the chloride of ammonium.

Solubility.—This drug is soluble in water and in glycerin.

Therapeutic Applications.—*Hydrochloride of hydroxylamin* has been recommended as a substitute for anthrarobin, chrysarobin, and pyrogallol in the treatment of skin diseases. The drug has certainly done good service in lupus, and especially in parasitic disorders, such as psoriasis, mycosis tonsurans, sycosis parasitica, etc.

Administration.—This remedy is best applied locally in solutions of the strength of 1 : 1000.

HYOSCINE.

An alkaloid extracted from the seeds of *Hyoscyamus niger*. The chemical nature of the principle is represented by the formula $C_{17}H_{21}NO_3$.

Physical Properties.—*Hyoscine* itself is a non-crystallizable body, but the *hydrobromide* occurs in fine colorless crystals of a rhombic form.

Solubility.—This salt is soluble in water and in alcohol. The solution has a bitter and slightly pungent taste.

Physiological Action.—This drug causes in the lower animals loss of motor power and of reflex action by influencing the centres of the cord. It may sometimes produce wild delirium, although its effect usually is that of a depressant to the brain, causing sleep. Upon the circulation this drug appears to exercise a feeble influence, although in large amounts it is said to paralyze the vaso-motor system. This agent diminishes the pulse-rate generally, but it may accelerate it. The respiration is depressed and the pupil slightly dilated under the action of hyoscine.

Therapeutic Applications.—This drug is an excellent

sedative and hypnotic, and is especially useful in mental disorders, neuralgias, sexual over-excitement, and spermatorrhœa.

Contraindications.—Although an excellent remedy in the diseases mentioned, hyoscine has serious drawbacks to its use. It ought not to be administered in the sore throat of scarlet fever, from the fact that it may cause spasm of the glottis, and hence suffocation. It should not be employed in the insomnia of cardiac disease, nor should the remedy be given to asthmatic patients.

Administration.—The dose of hyoscine is from $\frac{1}{100}$ to $\frac{1}{200}$ grain (0.00065 to 0.003 gramme); for hypodermatic use, from $\frac{1}{200}$ to $\frac{1}{500}$ of a grain (0.00032 to 0.0013 gramme).

Toxicology.—Untoward effects under the use of hyoscine are common. The chief one is paralysis of the pharynx, and probably also of the laryngeal muscles. Poisoning by this substance may resemble that caused by atropine, although the respiration and the pulse-rate may be decreased by hyoscine. At all events, the poisoning should be treated as one produced by belladonna.

HYPNAL.

This is a mixture of chloral and antipyrin. It is chemically known as the *tri-chloral-dehydphenyl-dimethylpyrazolon*.

Physical Properties.—This drug is tasteless and odorless, is made up of rhombic crystals, and has a melting-point of from 136° to 140° F. (58° to 60° C.).

Solubility.—*Hypnal* is soluble in water in the proportion of 5 to 6 parts.

Therapeutic Applications.—This remedy is generally employed with good effect as an antispasmodic, and particularly as a hypnotic. It has been beneficial in neuralgic insomnia as well as in that arising from phthisis.

Administration.—The dose of hypnal is from 15 to

45 grains (1 to 3 grammes), and may be given in water or in solution with orange-peel syrup.[1]

ICHTHYOL.

This substance is obtained from a bituminous oil by distillation, and contains about 15 per cent. of sulphur. It is the *ammonium ichthyolsulphonate*, its chemical composition being represented as $C_{28}H_{36}S_3O_6(NH_4)_2$.

Physical Properties.—This drug is soluble in water, and partly so in alcohol, ether, and petroleum benzene.

Therapeutic Applications.—The therapeutic uses of ichthyol are quite extensive. The drug is certainly advantageous as an antiphlogistic and alterative and as an astringent, tonic, and anodyne. This medicament is of special value in a variety of cutaneous affections. While not a true germicide, it is said to arrest the development of bacteria. Internally, the remedy has given good results in the treatment of diseases of the gastro-intestinal tract, of the kidneys, in rheumatism, in syphilitic disorders, and even in leprosy. Its use in diseases of the respiratory organs has been recommended as an inhalation. Ichthyol has been found almost a specific in mosquito-bites, and of incalculable benefit in the abortive treatment of erysipelas. Hypodermatically, ichthyol is said to have acted well in cases of neuralgia.

Administration.—The internal daily dose of ichthyol is from 10 to 30 grains (0.6 to 2 grammes), and is best administered in capsules or in pill form. For external application there may be employed solutions and ointments, in chloroform, glycerin, and lanolin respectively, of the strength of from 10 to 50 per cent.

[1] *Butyl-hypnal* is a combination of antipyrin and butyl-chloral, analogous to hypnal. This new remedy occurs in the form of colorless crystals having an insipid bitter taste and an odor resembling that of butyl-chloral. It melts at 158° F. (70° C.), and is soluble in alcohol, ether, benzene, and chloroform. Perchloride of iron gives with butyl-hypnal a red solution. This latter substance is precipitated by picric acid; with alkalies it is decomposed into antipyrin, alkaline formate, and propyl chloroform. The medicament in question has not been tried in practical medicine, but it appears to have properties similar to those of chloral.

INULIN.

This principle, which is obtained from the root of the *Inula helenium*, is chemically represented by the formula $(C_6H_{10}O_5)_2$.

Physical Properties.—*Inulin* occurs as a white crystalline powder made up of refracting crystals.

Solubility.—This drug is soluble in water.

Therapeutic Applications.—Inulin has been recommended as a stimulating expectorant and in diabetes.

Administration.—The dose of inulin is from 1 to 3 grains (0.06 to 0.18 gramme). *Inulin bread* is manufactured for the use of diabetic patients.

IODOL.

This drug is obtained by the interaction of pyrrol and iodine. It is the *tetra-iodo-pyrrol*, the chemical composition of which is C_4I_4NH.

Physical Properties.—*Iodol* occurs as a grayish-brown, odorless, tasteless powder; when pure it is of a pale-yellow hue and more or less crystalline, decomposing between 284.8° F. and 302° F. (140° and 150° C.) with the evolution of iodine vapors.

Solubility.—Tetra-iodo-pyrrol is soluble in alcohol and ether, but is scarcely so in water.

Physiological Action.—In sufficiently large doses iodol is said to cause in the lower animals albuminuria, loss of muscular power, fall of the temperature, and fatty degeneration of the liver and kidneys. Several hours after the ingestion of the drug iodine may be detected in the saliva and the urine, this elimination lasting for several days.

Therapeutic Applications.—Iodol has been employed successfully as a general substitute for iodoform. It is antiseptic and alterative, and highly valuable in the treatment of syphilitic and tubercular disorders and in inflammatory troubles of the ear, larynx, tonsils, trachea, etc. Of late, this remedy has been found of service in the treatment of diabetes mellitus.

Administration.—The daily dose of iodol is from 6 to 20 grains (0.3 to 1.3 grammes), and even as high as 40 grains (2.6 grammes). Externally, this medicament is applied as a dusting-powder or in the form of solutions and ointments of a strength varying from 1 to 30 parts and 1 to 15 parts respectively. It may also be applied in the form of a collodion composed of 1 part of iodol, 10 parts of ether, and 5 parts of gun-cotton.

Toxicology.—Iodol is apt to produce toxic symptoms even when locally applied; among these may be mentioned dizziness, irregular and frequent pulse, vomiting, a feeling of general malaise, a rise of the bodily temperature, and albuminuria. This drug does not, however, appear to produce symptoms of full iodism, owing, probably, to its being slowly absorbed.[1]

IODO-NAPHTHOL-BETA.

This drug, likewise termed *naphthol-beta diiodide*, is obtained from the interaction of naphthol-beta and iodine.

Physical Properties.—The *diiodide of naphthol-beta* appears in the form of a greenish-yellow powder, tasteless and odorless.

Solubility.—This remedy is readily soluble in chloroform, slightly so in alcohol, acetic acid, and ether, and insoluble in water.

Therapeutic Applications.—Iodo-naphthol-beta has been particularly recommended as a substitute for iodoform in the treatment of wounds and ulcers. It is claimed to be a highly serviceable antiseptic.

Administration.—The diiodide of naphthol-beta may be applied as a dusting-powder.

[1] *Di-iodoform*, whose formula is said to be C_2I_4, is an odorless crystalline substance, easily decomposed under the influence of light; it then emits a characteristic odor. It is chemically the *tetra-iodo-ethylene*. This agent is especially soluble in hot toluene, and also in benzene, carbon disulphide, and chloroform; it is sparingly soluble in alcohol and ether, but is insoluble in water. Di-iodoform has been introduced into practical medicine also as a substitute for iodoform.

IODOPHENIN.

Also termed *iodo-phenacetin*, this body is a compound allied to phenacetin. It contains 50 per cent. of iodine. Though not accurately worked out, the chemical formula of iodophenin is said to be—

$$C_6H_4\begin{cases} OC_2H_5 & C_2H_5O \\ NI(CH_3CO) & (CH_3CO)IN \end{cases}C_6H_4.$$

I H

Physical Properties.—*Iodophenin* is a brownish powder, but when pure is a crystalline body, of an iodine odor and a burning taste, and colors the skin yellow. It melts and decomposes at from 266° to 267.8° F. (130° to 131° C.).

Solubility.—This drug is soluble in alcohol, glacial acetic acid, and boiling hydrochloric acid.

Therapeutic Applications.—This remedy is employed only for its antiseptic properties.

Administration.—Iodophenin is locally applied.[1]

IODOPYRIN.

Also called *iodantipyrin*, this drug is a substitute-product of antipyrin in which one atom of hydrogen in the benzene nucleus is replaced by iodine. Its formula then is as follows: $C_6H_4IN\begin{matrix} CO.CH \\ NCH_3.CCH_3 \end{matrix}$.

Physical Properties.—*Iodopyrin* appears as a colorless and tasteless substance made up of acicular prismatic crystals having a melting-point of 336° F. (160° C.).

Solubility.—This drug is soluble in hot water, but scarcely so in cold water.

Therapeutic Applications.—*Iodopyrin* is used for its

[1] The name of *iodo-pheno-chloral* is given to a mixture of equal parts of iodine, carbolic acid, and chloral hydrate. This combination has been recommended in the treatment of skin diseases, particularly those of parasitic origin.

antipyretic effects. It has rendered good service in the treatment of typhoid fever and tuberculosis, and appears also to have analgesic properties similar to those of antipyrin.

Administration.—This remedy is given in doses of from 1 to 15 grains (0.06 to 1 gramme).

JAMBUL.

No chemical studies have yet been made of this plant, which is the *Eugenia jambolana* or *Syzygium jambolanum*.

Physical Properties.—*Jambul* appears in the form of a brown powder.

Solubility.—This drug is soluble in alcohol, but not in water.

Therapeutic Applications.—This new medicament has been found particularly useful in the treatment of diabetes mellitus. It has also some value in the diarrhœas of children.

Administration.—Jambul powder is given in doses of from 10 to 15 grains (0.6 to 1 gramme).

KAIRIN.

The *ethyl-kairin*, or *hydrochloride of oxy-chinolin ethyl*,[1] is obtained from chinolin, its formula being $C_9H_{10}(C_2H_5)$-NOHCl.

Physical Properties.—*Kairin* is a bitter, nauseous substance.

Solubility.—This drug is soluble in water, less so in alcohol, but insoluble in ether.

Therapeutic Applications.—Kairin has been used for its antipyretic properties as a succedaneum of quinine.

Administration.—This remedy is best administered in pill form, in doses of from 5 to 15 grains (0.3 to 1 gramme).

[1] A new body named *ortho-oxyethyl-ana-mono-acetylamidochinolin*, recently brought out, is said to possess also antipyretic properties, but has not yet been used in practical medicine.

KAVA-KAVA.

This plant, known under a variety of names, such as kava, ava, kara, kawa, yangona, and kava-kava, is the *Piper methysticum* and other species. It has not as yet been thoroughly studied. It is said to contain a principle which has received various names, such as *methysticin*, *lewinin*, *kavahin*, and *yangonin*, the true nature of which, however, remains unknown.

Physiological Action.—*Local Action.*—This drug produces anæsthesia at the point of injection when given hypodermatically; in contact with mucous membranes it causes a burning pain at first, followed by complete loss of sensibility.

Nervous System.—Internally, kava-kava produces, in moderate quantities, stimulating effects, but not those of intoxication (as has been alleged), followed by muscular weakness and general anæsthesia. It at first diminishes and finally destroys the function of the peripheral sensory nerves. Reflex action is also lessened and ultimately destroyed through an action upon the cord and probably also on the afferent nerves. The paralysis is of spinal origin.

Circulation.—Kava-kava, while diminishing the cardiac pulsations, increases the force of the heart by influencing the cardio-inhibitory centres and ganglia. The arterial pressure is diminished through an action on the vagi, but is afterward increased by a direct cardiac action.

Respiration.—This drug first stimulates and then paralyzes this function by acting on the respiratory centres.

Temperature.—Kava-kava in small quantities slightly increases, and in large doses diminishes, the temperature.

Salivary Secretion.—This drug notably increases the salivary secretion.

Therapeutic Applications.—Although a good local anæsthetic, kava-kava is chiefly employed as a bitter tonic and as a useful remedy in the treatment of inflammations of the genito-urinary tract. It has given very satisfactory results in gonorrhœa and cystitis.

Administration.—The best preparation of this plant is the fluid extract, which may be given in single doses of from 15 to 60 minims (1 to 4 grammes).

KOUSSEIN.

The active principle obtained from the dried flowers and unripe fruit of *Brayera anthelmintica* or *Hagenia abyssinica*. Its chemical composition has not been made out.

Physical Properties.—*Kousscin* is an amorphous, yellowish-brown crystalline powder having a bitter and pungent taste.

Solubility.—This drug is readily soluble in alcohol, chloroform, and ether; it is but slightly soluble in water.

Therapeutic Applications.—Koussein is chiefly employed as an anthelmintic.

Administration.—This remedy is best given in pill form, in doses of from 15 to 30 grains (1 to 2 grammes), and even as high as a drachm (4 grammes).

KRESIN.

This is a mixture of a solution of cresylic acid and a solution of sodium-oxyl-acetate to which the name of *kresin* has been given. It occurs in the form of a clear brownish liquid said to contain 25 per cent. of cresols. Kresin is miscible with water and alcohol. In the strength of 1 per cent. it has been recommended as a general disinfectant, being, it is claimed, less toxic than carbolic acid.

LACTUCIN.

This principle, whose chemical composition has not yet been determined, is taken from the juice of the common lactucarium (*Lactuca virosa*).

Physical Properties.—*Lactucin* appears in white scales.

Solubility.—This drug is soluble in alcohol and in water in the proportion of 60 to 80 parts.

Therapeutic Applications.—This remedy is said to possess sedative and hypnotic virtues.

Administration.—Lactucin may be given in doses of from 1 to 5 grains (0.06 to 0.3 gramme).

LANOLIN.

A fat obtained from sheep's wool, containing about 30 per cent. of water. Its technical name is *adeps lanæ hydrosus.*

Physical Properties.—This substance is white and odorless, and does not affect moist litmus. A good preparation should melt between 98.6° and 113° F. (37° and 44° C.). Unlike glycerin, it does not saponify by the action of aqueous alkalies. Saponification of *lanolin* takes place by heating this with alcoholic potash.

Solubility.—*Lanolin* is insoluble in water, partly soluble in alcohol, but is readily taken up by ether, benzene, and acetone.

Therapeutic Applications.—Lanolin is particularly advantageous as an absorbent, powerfully resisting, besides, the decomposing action of organisms. This drug by itself, or, better still, in combination with resorcin, is serviceable in diseases of the skin, such as eczema, acne, etc., in many of which it greatly relieves the itching. It is also valuable as a local application in the treatment of the eruptive fevers. It is one of the best ointment bases known. The remedy has given excellent results in the treatment of gonorrhœa, applied by means of a bougie.

Administration.—Lanolin is used only locally, by itself or in combination with other remedies.

LANTANINE.

An alkaloid obtained from *Lantana brasiliensis*, the chemical composition of which has not as yet been made out.

Therapeutic Applications.—This drug is alleged to be an antipyretic and antiperiodic. It is said to have

done good service in cases of malaria in which quinine had failed.

Administration.—The dose of *lantanine* is given as from 15 to 30 grains (1 to 2 grammes).

LEPTANDRIN.

This glucosidal principle, which is not yet fully examined as regards its chemical nature, is obtained from the rhizome of *Leptandra virginica.*

Therapeutic Applications.—*Leptandrin* is a stimulant to the biliary secretion, and is alleged to possess purgative properties; it is especially applicable when the stools are clay-colored.

Administration.—The dose of leptandrin is put down as from 1 to 3 grains (0.06 to 0.18 gramme).

LIPANIN.

This substance is simply a mixture of olive oil and oleic acid in the proportion of 1 to 6 parts.

Therapeutic Applications.—This remedy has been used with success as a substitute for cod-liver oil in those affections in which the latter medicament is indicated. *Lipanin* appears to give better results in such cases when given in combination with the hypophosphites of calcium and sodium.

Administration.—The dose of lipanin is from 1 to 4 drachms (4 to 15 grammes).

LITHIUM SALICYLATE.

This salt, recently introduced into practical medicine, is represented by the formula $LiC_7H_5O_3, \frac{1}{2}Aq$.

Physical Properties.—*Lithium salicylate* occurs as a white powder.

Solubility.—This salt is readily soluble in alcohol, and to a certain extent in water.

Therapeutic Applications.—*Salicylate of lithium* has been successfully employed in articular rheumatism as a

substitute for the sodium salt, to which it is said to be superior in chronic rheumatic affections.

Administration.—The daily dose of lithium salicylate is 1 drachm (4 grammes).[1]

LOBELINE.

This alkaloid, extracted from the seeds and leaves of *Lobelia inflata*, has not been studied in a thorough manner chemically.

Physical Properties.—This alkaloidal principle appears as a yellowish liquid of the consistency of syrup. The *sulphate*, however, is a yellowish-white powder.

Physiological Action.—*Nervous System.*—*Lobeline* at first produces an increase of reflex action, followed by a diminution and final loss of the same. The drug acts particularly on the motor nerves, paralyzing them.

Circulation.—This drug generally causes a rise of the arterial pressure through a peripheral stimulation of the vaso-motor system, and probably also by a direct cardiac action. The pulse becomes irregular under the influence of the remedy, but there appears to be an increase of power in the cardiac beat.

Respiration.—Lobeline in small amounts acts as a respiratory stimulant, increasing the depth as well as the rate of the movements. Large doses, however, produce asphyxia and death, mainly through respiratory failure. The action is chiefly on the respiratory centres, although this drug is alleged to produce peripheral paralysis of the pneumogastric fibres.

Therapeutic Applications.—This salt has been highly recommended as an antispasmodic in the treatment of asthma and bronchitis, especially in the spasmodic forms of those disorders.

[1] *Lithium dithio-salicylate* has been brought to the notice of the profession as a good remedy in the treatment of rheumatic disorders, especially gout and arthritis.

Administration.—The dose of the sulphate of lobeline is from 1 to 6 grains (0.06 to 0.36 gramme), given either by the mouth or hypodermatically.

Toxicology.—The most prominent symptoms of poisoning produced by lobeline are—violent vomiting, and sometimes purging; *irregular respiration* followed by phenomena of asphyxia; great prostration; cold sweating; livid face; pale skin; feeble pulse; sometimes burning in the fauces and œsophagus; dilated fixed pupil; fall of the bodily temperature; muscular tremors, convulsions, stupor, and coma. Death is generally produced by failure of the respiration. In cases of poisoning the treatment should consist in washing out the stomach with solutions of tannic acid; the administration of opium to allay pain, and that of alcohol, ammonia, strychnine, and digitalis hypodermatically to sustain the respiration and the action of the heart, together with the active application of external heat.

LORETIN.

The above short name is given to *meta-iodo-ortho-oxyquinolin-anasulphonic acid*, a new antiseptic remedy.

Physical Properties.—Loretin appears in the form of a yellow, odorless, crystalline powder, forming salts with metallic oxides.

Solubility.—This drug is sparingly soluble in water and in alcohol, but forms emulsions with ethereal and oily fluids, particularly with collodion. It is insoluble in oils and ether. The alkali salts are easily soluble in water, giving an orange color.

Therapeutic Applications.—Loretin has been proposed as an excellent succedaneum for carbolized water. It is said to be non-poisonous and to exercise decided antiseptic powers. It is likewise believed to have some antithermic virtues. This new drug is reported to have been of undoubted service, locally applied, in the treatment of wounds, fistulæ, and burns, and in that of

cutaneous affections, such as eczema, erysipelas, lupus, furuncles, and phlegmons.

Administration.—Loretin is best applied as a dusting-powder or in the form of loretin-collodion. For cavity-wounds and fistulæ loretin-gauze and loretin-bougies respectively may be employed.

LOSOPHAN.

When iodine is made to act upon oxytoluic acid in the presence of an alkali, a substance called *losophan* is produced. This drug is said to contain 78.39 per cent. of iodine. Losophan is the *tri-iodocresol*.

Therapeutic Applications.—This medicament is recommended as a powerful antimycotic and parasiticide. It has been used with success in diseases of the skin, such as herpes tonsurans, scabies, pityriasis versicolor, acne, etc. It has been particularly serviceable, locally applied, in eczema, pruritus, prurigo, lichen, chancroid, and syphilitic chancres.

Administration.—Losophan is employed in the form of powder or in solution, and in ointments of the strength of from 10 to 20 per cent.

LYSOL.

This substance, which is obtained from tar-oils by boiling with alkalies and fats, contains about 50 per cent. of cresols.

Physical Properties.—*Lysol* appears as a brown, unctuous-looking, clear liquid having an aromatic odor resembling that of creosote. The saponaceous character of lysol renders instruments immersed in its solution somewhat slippery. It has a sp. gr. of 1.042.

Solubility.—This drug is soluble in water, alcohol, chloroform, glycerin, bisulphide of carbon, and benzene.

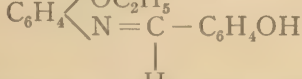
Therapeutic Applications.—Lysol is used as a general antiseptic in surgery and gynecology. It has been found of value in diseases of the skin, particularly in lupus. This drug has been recommended in diphtheria

and as a gargle for foul breaths. In the form of an injection it has been found highly serviceable in the treatment of acute blennorrhagia.

Administration.—This remedy is used locally in solutions of the strength of from 3 to 5 per cent. For injections—as in blennorrhagia, for instance—solutions of the strength of 1 per cent. may be employed.

MALAKIN.

This name is applied to *salicyl-paraphenetidin*, a substance closely related to phenacetin. The chemical composition of *malakin* is represented as—



Physical Properties.—Salicyl-paraphenetidin appears in the form of small, fine, bright-yellow needles melting at 197.6° F. (92° C.). It contains about 50 per cent. of salicylaldehyd; it can be decomposed by mineral acids, and is then split up into salicylaldehyd and paraphenetidin. It gives a yellow color with soda-lye.

Solubility.—Malakin is soluble in hot alcohol and in soda-lye, sparingly soluble in cold alcohol, and insoluble in water.

Therapeutic Applications.—Though acting more slowly than antipyrin and antifebrin, malakin has been found to exercise a beneficial influence in febrile disorders, such as typhoid fever, pneumonia, tuberculosis, scarlet fever, and erysipelas. The antipyretic action is said to be unaccompanied with disturbances of the circulation. This drug has likewise given good, but not decided, results in the treatment of neuralgia, although it does not completely destroy the pain in these cases. It is said to be well borne by the stomach.

Administration.—The single dose of salicyl-paraphenetidin is put down as from 7½ to 15 grains (0.5 to 1 gramme), and is best given in wafers or capsules. For

children it can be administered in some kind of fruit-jelly, in corresponding doses.

MECONARCEINE.

The chemical nature of this drug has not been definitely determined; it is said to be a derivative of *narceine* contained in opium.

Physical Properties.—This substance appears in lemon-yellow crystals having a melting-point of 358.8° F. (126° C.) accompanied with some decomposition.

Solubility.—*Meconarceine* is soluble in 50 per cent. alcohol, and to some extent in boiling water.

Therapeutic Applications.—This remedy has been lauded, given internally, in bronchial affections, neuralgias, and insomnia. It has been somewhat effective in the treatment of the opium-habit.

Administration.—The dose of *meconarceine* may be set down as from $\frac{1}{6}$ to $\frac{1}{2}$ grain (0.01 to 0.03 gramme).

MENTHOL.

Obtained from the oil of peppermint-camphor and the essential oils of other plants. Menthol is represented chemically by the formula $C_{10}H_{20}O$.

Physical Properties.—This drug is made up of colorless acicular crystals, of a prismatic form, having an odor resembling that of peppermint. It melts at 107.6° F. (42° C.) and boils at 413.6° F. (212° C.).

Solubility.—*Menthol* is soluble in ether and the fixed oils, and slightly soluble in water.

Therapeutic Applications.—This remedy is a stimulant, sedative, and anæsthetic. It is serviceable as a stomachic and carminative, and has been used with success in colicky pains and the vomiting of pregnancy. Influenza and pulmonary tuberculosis have received benefit from its action. Locally applied, the drug is recommended in migraine and neuralgias.[1]

[1] The *benzoate of menthol* and *chloral-menthol* are two combinations which seem to have produced good results in the local treatment of toothache, migraine, neuralgias, etc.

Administration.—This remedy is best given in pill form or emulsion, in single doses of from ½ to 2 grains (0.03 to 0.12 gramme).

MERCURIAL IMIDO-SUCCINATE.

The formula of this compound is given as $(C_2H_4(CO)_2N)Hg$.

Physical Properties.—This substance appears in the form of a white crystalline powder.

Solubility.—The *imido-succinate of mercury* is soluble in water and in alcohol, in the proportion of 1 to 25 and 1 to 300 parts respectively.

Therapeutic Applications.—*Mercuric imido-succinate* has been used chiefly as an antisyphilitic.

Administration.—The dose of this remedy is $\frac{1}{5}$ grain (0.012 gramme).

MERCURIC GALLATE.

This combination is said to have a close chemical relation to the tannate and to be more stable than the latter. *Gallate of mercury* contains about 37.17 per cent. of the metal.

Physiological Action.—Owing to a rapid absorption, the presence of mercury has been detected in the urine within twenty-four hours after the ingestion of the gallate. This drug has caused apparently no mercurial poisoning of any kind, nor even stomatitis or salivation.

Therapeutic Applications.—Mercuric gallate has been used with good results as a powerful antisyphilitic remedy, ranking in utility with the protiodide and the bichloride, with the advantage, as just intimated, of not causing ptyalism when administered in therapeutic doses. This combination has been employed especially in the second and tertiary forms of syphilis. It is said to have rendered marked service in the grave forms of the second stage of the disease as observed in alcoholic or cachectic patients. In cases in which general cachexia, bad teeth, or digestive disturbances are prominent factors

the gallate is to be preferred to all other forms of mercury.

Administration.—The gallate of mercury is best given in pill form, in daily doses of from 1½ to 3 grains (0.10 to 0.20 gramme).

MERCURIC PHENYLATE.

This salt, also called *mercuric carbolate*, is represented by the formula $(C_6H_5O)_2Hg$.

Physical Properties.—This drug appears in the form of colorless needles.

Solubility.—*Phenylate of mercury* is readily soluble in hot alcohol, ether, and glacial acetic acid; it is not soluble in water.

Therapeutic Applications.—*Mercuric carbolate* is principally employed in the treatment of syphilitic affections.

Administration.—The dose of this drug is from $\frac{1}{3}$ to $\frac{1}{2}$ grain (0.02 to 0.03 gramme) twice or thrice a day.

MERCURIC SALICYLATE.

The composition of this substance is $C_6H_4OCO_2Hg$.

Physical Properties.—The *salicylate of mercury* occurs as a white neutral powder, odorless and tasteless.

Therapeutic Applications.—*Mercuric salicylate* has been employed successfully, both internally and externally, in the treatment of syphilitic disorders and in gonorrhœa.

Administration.—This salt is best administered in pill form, in single doses of from $\frac{1}{60}$ to $\frac{1}{8}$ grain (0.001 to 0.008 gramme). In gonorrhœa injections of the strength of 0.4 in 1000 may be employed.

MERCURIC THYMOLACETATE.

A substance with a chemical composition represented as $(C_{10}H_{13}O)Hg—HgC_2H_3O_2$.

Therapeutic Applications.—This remedy is not only used against syphilis, but is also of value in the treatment of pulmonary tuberculosis.

Administration.—*Thymolacetate of mercury* is given internally in pill form, hypodermatically, or in intramuscular injections, in doses of from $\frac{1}{12}$ to $\frac{1}{6}$ grain (0.005 to 0.010 gramme).

MERCURIC THYMOLATE.

Another compound of mercury, having a formula of $(C_{10}H_{13}O)Hg—HgNO_3$.

Physical Properties.—This drug when pure is odorless and tasteless, but is liable on exposure to acquire a slight odor of thymol.

Therapeutic Applications.—*Thymolate of mercury* has been particularly recommended in the treatment of syphilis.

Administration.—The dose is about the same as that of the thymolacetate.[1]

METALDEHYD.

The action of polymerizing agents upon aldehyd at a temperature below 32° F. (0° C.) gives rise to the formation of *metaldehyd;* it may also be obtained by passing hydrochloric acid vapors through acetic aldehyd and then freezing the mixture. It is a body represented by the formula $(C_2H_4O)_n$.

Physical Properties.—This drug is a white crystalline substance made up of needles or tetragonal prisms which sublime between 233.6° and 239° F. (112° and 115° C.) without melting.

[1] Many other combinations of mercury have of late been brought to the notice of the profession, chief among which may be mentioned the *benzoate* $(C_6H_5COO)_2Hg,H_2O$, a crystalline body, tasteless, odorless, and soluble in hot water and alcohol; the *formamidate:* the *naphtholate*, an odorless lemon-yellow powder containing about 30 per cent. of mercury; the *naphtholacetate*, a white crystalline substance; the *oxycyanide*, $Hg_2O(CN)_2$; the *peptonate*, a yellowish liquid with a saline and slightly metallic taste; the *tannate*, occurring in brownish-green odorless and tasteless scales; and the *thymolsulphate*. All these salts have been recommended in the treatment of syphilis. Other mercuric compounds will be described under other names.

Solubility.—*Metaldehyd* is readily soluble in hot alcohol and ether, but insoluble in water.

Therapeutic Applications.—This medicament possesses hypnotic virtues similar to those of paraldehyd, but its use in practical medicine has not been very extensive.

Administration.—The dose of metaldehyd may be said to be more or less the same as that of paraldehyd.

METAMIDOPHENYLPARAMETHOXYCHINOLIN.

Therapeutic Applications.—This drug has recently been recommended as an antiperiodic in the treatment of malarial diseases, in which it is said to equal quinine.

Administration.—It has been given in doses of from $3\frac{4}{5}$ to $7\frac{3}{4}$ grains (0.25 to 0.50 gramme).

METHACETIN.

This name is applied to *para-acetanisidin* or *para-oxymethylacetanilid*, or *acetyl-methyl-para-amido-phenol*, being thus chemically constituted: $C_6H_4.OCH_3:NHCH_3CO$.

Physical Properties.—*Methacetin* occurs in crystalline scales, almost colorless or somewhat reddish, and without taste. It melts at 260.6° F. (127° C.).

Solubility.—This drug is readily soluble in alcohol, chloroform, glycerin, and warm fatty oils; also in water in the proportion of 1 to 260 parts.

Physiological Action.—Large doses cause death preceded by convulsions. It is said to reduce the bodily temperature by diminishing both heat-production and heat-distribution.

Therapeutic Applications.—Methacetin has been much lauded as an antiseptic and analgesic. It is especially suitable in the treatment of febrile diseases of children. This remedy has proved to be of value in rheumatic and tubercular affections. It has given good results in the pyrexia of phthisis, in which it is said to

be better administered early in the afternoon when given once daily.

Administration.—Methacetin is given in doses of from 2 to 5 grains (0.12 to 0.3 gramme), and is best administered in mucilage or in cachets.

Toxicology.—Methacetin is apt to depress the heart, and sometimes collapse accompanied or preceded by profuse sweating follows the ingestion of the drug.

METHOXYCAFFEINE.

A derivative of caffeine, and found also in other allied plants. Its chemical composition is $C_8H_9(OCH_3)H_4O_2$.

Physical Properties.—This drug appears in white crystalline needles having a melting-point of 350.6° F. (177° C.).

Therapeutic Applications.—*Methoxycaffeine* has been found beneficial in cases of migraine and in neuralgias. It is even said to possess anæsthetic properties superior to those of cocaine, especially when it is injected hypodermatically.

Administration.—The dose of the medicament is about 4 grains (0.24 gramme).

METHYLAL.

Methylal is also designated by the term *methylenmethylether*, and results from the interaction of methylic alcohol, binoxide of manganese, and sulphuric acid. It is represented thus: $CH_2(OCH_3)_2$.

Physical Properties.—Methylal is a highly volatile liquid having a penetrating ethereal odor. Its melting-point is 107.6° F. (42° C.), and it has a sp. gr. of 0.855.

Solubility.—This remedy is soluble in alcohol and in ether, in fatty and ethereal oils, and in water in the proportion of 1 to 13 parts.

Physiological Action.—This drug diminishes reflex action and the irritability of the cerebral cortex. In sufficiently large amounts it acts upon the cardiac ganglia

and muscle, causing increased rate of the pulse and a reduction of the blood-pressure and the bodily temperature.

Therapeutic Applications.—Methylal has been used with marked effect as a hypnotic, and particularly in the treatment of insanity and the insomnia of delirium tremens. It has also been employed as a local anæsthetic.

Administration.—The dose of methylal varies from 15 to 30 minims (1 to 2 grammes), and even as high as 2 drachms (8 grammes).

METHYL CHLORIDE.

Other names are applied to this substance, such as *chlormethyl* and *monochlormethane*. It is obtained by the action of hydrochloric acid upon alcohol. Its chemical composition is represented as CH_3Cl.

Physical Properties.—*Chloride of methyl* is a colorless gas with an odor resembling that of ether and chloroform. It is somewhat inflammable, and burns with a greenish flame. It liquifies at −13° F. (−25° C.), and at −9.6 F. (−23.7° C.) has a sp. gr. of 0.9915. It boils at −5.8° F. (−21° C.).

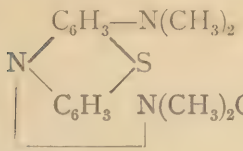
Solubility.—*Chlormethyl* is readily soluble in ether and in chloroform, less so in alcohol; in water, in one-fourth its volume.

Therapeutic Applications.—The most marked properties of this drug are those of an anæsthetic, and as such it has been employed in minor surgical operations. It has rendered good service in the local treatment of neuralgia, spinal pains, pruritus, etc.

Administration.—This remedy is best applied in the form of a spray.

METHYLENE BLUE.

This substance is classed as one of the aniline dyes, and is also called *tetramethylthionin*. Its chemical formula is represented as follows:



Physical Properties.—This drug appears as a bluish powder composed of scaly crystals, dark green in transverse fracture, and of a bronze-like tinge.

Solubility.—*Methylene blue* is somewhat soluble in water, and more so when this vehicle contains alcohol.

Therapeutic Applications.—This new remedy has been largely used with apparent success as an anodyne in the treatment of rheumatic and neuralgic disorders, and likewise in pulmonary tuberculosis and scrofula. Quite recently it has been highly recommended as an antiperiodic, particularly in cases in which quinine has failed, and in the local treatment of diphtheria.

Administration.—The dose varies from 1½ to 8 grains (0.09 to 0.52 gramme), and is best given in wafers or capsules. Hypodermatically it can be injected in doses of from ⅓ to 1 grain (0.02 to 0.06 gramme).

METHYLENE CHLORIDE.

This drug, which is also known by the name of *dichlormethane*, is obtained by the action of chlorine on monochlormethane or by reducing chloroform by zinc and hydrochloric acid. It has the composition CH_2Cl_2.

Physical Properties.—*Chloride of methylene* is a colorless liquid with an odor resembling that of chloroform. Its sp. gr. at 59° F. (15° C.) is 13.6; it melts at 106° F. (41.6° C.).

Solubility.—This drug is soluble in alcohol and in ether.

Therapeutic Applications.—*Methylene chloride* has been recommended as a substitute for chloroform, but is now chiefly employed as a local anæsthetic.

Administration.—This drug is used solely in the form of a spray.

MICROCIDIN.

The common name of microcidin is given to a mixture of β-naphthol with sodium hydrate. It may be said to be a *naphtholate of sodium.*

Physical Properties.—*Microcidin* is a white powder.

Solubility.—*Sodium naphtholate* is soluble in water in the proportion of 1 to 3 parts.

Therapeutic Applications.—Microcidin is employed as an antiseptic both externally and internally. It has also some antipyretic properties. It is particularly used in the treatment of wounds.

Administration.—This remedy is applied in solutions of the strength of from 3 to 5 in 1000.

MORRHUOL.

The active principle of cod-liver oil.

Therapeutic Applications.—*Morrhuol* has the same uses as cod-liver oil.

Administration.—This drug is best given in capsules, in doses of 3 grains (0.20 gramme).

MUSCARINE.

An alkaloid obtained from a fungus (*Agaricus muscarius*), having a formula of

$$\begin{matrix}(CH_3)_3 \\ C_2H_3O_2\end{matrix}\Big\rangle N.OH.$$

Physical Properties.—*Muscarine* appears as a crystalline, hygroscopic substance.

Solubility.—This alkaloid is freely soluble in alcohol.

Therapeutic Applications.—This remedy has of late been employed with apparent success in the treatment of diabetes insipidus.

Administration.—The proper dose has not been determined with accuracy.

MUSSANIN.

This name is applied to *Acacia anthelmintica*, whose chemical constitution has not yet been studied.

Therapeutic Applications.—*Mussanin* has been introduced into practical medicine as a powerful anthelmintic, and as such is considered superior to kousso.

Administration.—This remedy is given in the form of an infusion in doses of from 1 to 2 ounces (32 to 64 grammes).

MYRTOL.

This substance is obtained from the oil of *Myrtus communis*, and is supposed to be a mixture of dextro-pinene and eucalyptol.

Physical Properties.—*Myrtol* occurs as a clear liquid with a not unpleasant odor.

Therapeutic Applications.—*Myrtol* has been recommended as a prompt remedy in diseases of the respiratory tract.

Administration.—The dose of myrtol is put down as 5 minims (0.30 gramme).

NAPELLINE.

An alkaloid obtained from the root of the common wolf's-bane or monk's-hood (*Aconitum napellus*).

Physical Properties.—This drug appears as an amorphous white powder.

Solubility.—*Napelline* is soluble in ether and in water.

Physiological Action.—Identical with aconitine, the action of napelline may be said to resemble that of the former alkaloid.

Therapeutic Applications.—Napelline is chiefly employed as an antineuralgic, and has been used with asserted success as a substitute for morphine in cases of habitués to this alkaloid or to opium.

Administration.—The dose of this drug varies from $\frac{1}{6}$ to $\frac{1}{2}$ grain (0.010 to 0.03 gramme).

NAPHTHALENE.

Also styled *naphthalin*, a hydrocarbon obtained from coal-tar, and also produced synthetically from phenyl-butylene by the action of heat. Its formula is $C_{10}H_8$.

Physical Properties.—This medicament occurs as a grayish-white powder made up of large brilliant scales with a coal-tar-like odor and an aromatic bitter taste. Its sp. gr. is 1.158; it melts at 176° F. (80° C.) and boils at 428° F. (220° C.).

Solubility.—*Naphthalin* is soluble in alcohol, ether, the fixed and volatile oils, and acetic acid; it is insoluble in water.

Therapeutic Applications.—This drug has been recommended as a vermifuge against the oxyuris vermicularis, as an expectorant in chronic catarrh of the lungs, as an antiseptic in chronic diarrhœa and typhoid fever, and as an antispasmodic in whooping-cough. Externally, *naphthalene* is of service particularly in diseases of the skin, such as eczema, psoriasis, lepra, etc., and as a disinfectant in the treatment of wounds.

Administration.—Internally, the dose of naphthalin is from 2 to 15 grains (0.12 to 1 gramme); it is best given in pill form, in mucilage, in cachets, or in capsules. For external application solutions or ointments of the strength of from 10 to 12 and 5 to 10 per cent. respectively may be used, or the drug may be employed as a dusting-powder, disguising its odor with a few drops of the oil of bergamot. Inhalations may also be employed.

NAPHTHOL.

Iso- or *beta-naphthol*, another name of this drug, is a compound obtained from naphthalene by a process of substitution through the prolonged action of sulphuric acid. A hydrogen atom is replaced by a hydroxyl

group, and thus its formula is represented by $C_{10}H_7OH$ or $C_{10}H_8O$.

Physical Properties.—Iso-naphthol is a brilliant crystalline body having an odor resembling that of phenic acid and a slight burning taste. Its melting-point is 253.4° F. (123° C.), and it boils at 546.8° F. (286° C.). A solution in water gives a bluish-violet fluorescence on the addition of ammonia or soda. Ferric chloride exhibits a green tint by which it is distinguished from alpha-naphthol, which gives a violet color with the same reagent.

Solubility.—Beta-naphthol is readily soluble in alcohol, ether, chloroform, benzene, and the fatty oils; it is almost insoluble in cold water, but fairly so in hot water.

Therapeutic Applications.—Naphthol is much used as a general antiseptic in cutaneous disorders, organic or parasitic, and in affections of the respiratory tract. It has been of service in the treatment of chronic middle-ear disease, and as an intestinal antiseptic in typhoid and typhus fevers and in chronic diarrhœas. This remedy has bactericidal powers. It has of late been found serviceable as a vermifuge in cases of ascarides.

Administration.—The internal dose of naphthol varies from 2 to 15 grains (0.12 to 1 gramme). Externally, alcoholic solutions of the strength of from 2 to 10 per cent., or ointments of the strength varying from 3 to 10 per cent., are employed.[1]

[1] There are other allied compounds and derivatives of naphthol, chief among which may be mentioned *naphthol-aristol* or *di-iod-beta-naphthol*, a mixture of iodine, iodide of potassium, beta-naphthol, and carbonate and hypochloride of sodium; *naphthol-camphor*; *naphtopyrin*, a combination of naphthol and antipyrin; *alpha-naphthol*; *alpha-oxynaphtoic acid*; and others already described under various names. Most of these derivatives and compounds have been used for the same purpose as beta-naphthol itself. The most recent combination is the *beta-naphthol-bismuth*, which is said to contain 80 per cent. of the oxide of bismuth. This compound is recommended as an excellent intestinal antiseptic. It occurs in the form of a neutral brown odorless powder, insoluble in water. It is decomposed in the intestines into its component parts, the bismuth being eliminated by the stools, the beta-naphthol by the urine. The dose of the drug is put down as from 15 to 30 grains (1 to 2 grammes). (See p. 52.)

NAREGAMIA.

This plant, belonging to the family *Meliaceæ* and commonly called *Goa ipecacuanha*, is the *Naregamia alata*, which is stated to contain an alkaloid, *naregamine*.

Therapeutic Applications.—This drug is said to be highly serviceable in dysentery and bronchial catarrhs. It is recommended also as an expectorant in diseases of the respiratory tract, especially in pulmonary emphysema.

Administration.—A tincture of the plant is given in doses of from 16 to 48 minims (1 to 3 grammes) per day.

NEURODIN.

Chemically, *neurodin* is the *acetyl-paraoxyphenyl-urethane*, and is obtained by acetylizing paroxyphenylurethane by heating with acetic-acid anhydride. This new product is represented by the formula

$$C_6H_4\begin{cases}OCOH_3\\NHCOOC_2H_5.\end{cases}$$

Physical Properties.—Neurodin occurs in the form of odorless and colorless crystals having a melting-point of 188.6° F. (87° C.).

Solubility.—This drug is soluble in boiling water in the proportion of 1 to 140 parts.

Therapeutic Applications.—Neurodin is non-poisonous, and has antineuralgic and antipyretic properties. It has been employed successfully in the treatment of febrile diseases, such as pneumonia, typhoid fever, scarlatina, pleurisy, and erysipelas. As an antineuralgic remedy it has done good in a variety of nervous disorders, among which may be mentioned ordinary headache, cerebral tumor, migraine, neuralgia, locomotor ataxia, sciatica, and rheumatic disturbances. This drug has not produced symptoms of collapse, although the fall of the bodily temperature under its influence is said to be sometimes accompanied with profuse sweating,

some cyanosis, and vomiting. The good effects come on in about half an hour.

Administration.—Neurodin can be administered in doses of from 15 to 22½ grains (1 to 1.5 grammes).

NIAOULI OIL.

This oil is obtained from the leaves of *Melaleuca viridiflora* by distillation. Its chemical composition is said to be similar to that of terpinol.

Physical Properties.—This substance occurs as a strongly aromatic yellow body having a pungent taste resembling that of the oil of peppermint. Niaouli oil has a sp. gr. of 0.922 and is not affected by litmus.

Solubility.—Niaouli oil is soluble in alcohol, benzene, and ether; it is insoluble in water.

Therapeutic Applications.—This drug possesses expectorant properties, and has been used with alleged good results in bronchitis and tuberculous affections. It is said to diminish the expectoration to a decided degree. The oil is well tolerated by the stomach.

Administration.—This medicament is best administered in emulsion or in capsules, in single doses of 4 minims (0.25 gramme). It may also be given hypodermatically in combination with sterilized olive oil.

NICOTINE.

A new salt of the alkaloid of *Nicotia tabacum* is the *bitartrate*, whose chemical constitution is $C_{10}H_{14}N_2$-$(C_4H_6O_6)_2$.

Physical Properties.—This salt occurs in fine white crystals with a tendency to fuse.

Solubility.—*Bitartrate of nicotine* is freely soluble in water.

Physiological Action.—The action of this salt is presumed to be the same as that of the alkaloid or other salts of nicotine, or the tobacco itself.

Therapeutic Applications.—This new salt has been highly recommended in the treatment of tetanus, and is

alleged to be an effective physiological antidote to strychnine.

Toxicology.—Nicotine-poisoning is manifested by the following marked symptoms: great depression; giddiness, with feeling of intense wretchedness and weakness; skin cold, clammy; pulse rapid, running, and finally imperceptible; dyspnœa; muscular tremblings; and sometimes convulsions. Death occurs from general collapse. In cases of poisoning the treatment should consist in washing out the stomach, the administration of cardiac and respiratory stimulants such as strychnine and digitalis, and the application of external heat and rubbings. In the mild forms of poisoning, such as that occurring from excessive smoking, the administration of Hoffman's anodyne in ice-water has been recommended.

NITROGLYCERIN.

Nitroglycerin, commonly called *glonoin* or *trinitrin*, is the *trinitrate of glycerol*, obtained by the action of sulphuric and nitric acids upon glycerin. Its formula is as follows: $C_3H_5(O.NO_2)_3$.

Physical Properties.—*Nitroglycerin* is an oily substance, colorless and odorless, and of a sweetish taste. It has a sp. gr. of 1.60.

Solubility.—Trinitrin is soluble in alcohol and in ether, but is insoluble in water.

Physiological Action.—The action of this substance is the same as that of the other nitrites; it is, however, not so fugacious as the nitrite of amyl nor so persistent as the nitrites of potassium and sodium.

Therapeutic Applications.—This remedy is a powerful sedative in nervous disorders, and has been used with excellent results in the treatment of angina pectoris, in sick headache, in asthma, and in sea-sickness. It has been employed successfully also in epilepsy, especially in *petit mal*, in puerperal convulsions, and in Bright's disease.

Administration.—Nitroglycerin is best administered

in chocolate lozenges. The dose varies from $\frac{1}{100}$ to $\frac{1}{50}$ grain (0.00065 to 0.0013 gramme).

Toxicology.—Untoward effects are apt to follow the use of nitroglycerin, such as headache, a slow, irregular pulse, dilated pupils, a scanty urine containing large amounts of pigment, muscular weakness, a sense of constriction around the forehead, and pain over the cardiac region.

OREXIN.

The above common name is given to the *phenyl-dihydro-quinazolin hydrochlorate*, a derivative of chinolin, its chemical formula being C_6H_4,-CH_2N,CHN,-$C_6H_5HCl + H_2O$.

Physical Properties.—*Orexin* is a grayish, odorless powder, made up of brilliant crystals, with a tendency to efflorescence on exposure. It has a bitter and pungent taste.

Solubility.—This drug is soluble in water and in alcohol.

Therapeutic Applications.—Orexin is claimed to possess stomachic virtues, and is said to be an excellent appetizer. This remedy is especially valuable in the anorexia of anæmia, early phthisis, and that occurring in chronic gastric catarrh. This medicament appears to stimulate principally the secretion of hydrochloric acid. The uncombined or basic form of orexin has of late been recommended for use, on the ground that in this form the agent does not cause any pungent sensation on the mucous membrane. Orexin has been employed in emphysema, in insufficiency of the cardiac muscle, and in nephritis, in which cases, it is asserted, the appetite is increased and the nutrition essentially improved. This remedy has been warmly lauded also in the treatment of the vomiting of pregnancy.

Contraindications.—This drug is contraindicated in gastric ulcer.

Administration.—The dose of orexin is 3 grains (0.2

gramme) once or twice a day, and it is best administered in wafers (*not* in pill form) at meal-time.

ORTHIN.

This body is a derivative of phenylhydrazin, its chemical name being *orthohydrazin-para-oxybenzoic acid.*

Physical Properties.—This drug in the free state is unstable, but the *hydrochlorate* is a good and stable preparation.

Solubility.—*Orthin* is soluble in water.

Therapeutic Applications.—This remedy has been found to be a very decided antipyretic, and as such it has been employed with success in typhoid fever, acute articular rheumatism, pneumonia, and other febrile disorders.

Administration.—Orthin is given in doses of from 5 to 8 grains (0.30 to 0.50 gramme).

ORTHO-AMIDO-SALICYLIC ACID.

This new substance is salicylic acid in which one atom of hydrogen has been replaced by NH_2.

Physical Properties.—*Ortho-amido-salicylic acid* appears as a white, grayish, amorphous, almost odorless powder having a sweetish and not unpleasant taste.

Solubility.—This new medicament is insoluble in alcohol, ether, and water.

Therapeutic Applications.—Recent observations have found this remedy useful in the treatment of subacute articular rheumatism, and it is recommended as a substitute for the salicylate of sodium, but as yet no definite doses have been determined.

OSMIC ACID.

Osmic acid, also termed *perosmic acid*, *hyperosmic acid*, and *tetroxide of osmium*, is chemically constituted as OsO_4.

Physical Properties.—This acid occurs in yellow crystalline needles having a very strong disagreeable

odor. It boils at 212° F. (100° C.), and in solution has a burning taste.

Therapeutic Applications.—Osmic acid has of late been highly recommended in the treatment of goitre. It is asserted to be of service also in scrofula, in cancerous ulcers, and in neuralgia, and particularly in sciatica. Epilepsy is said to be greatly benefited by this remedy.

Administration.—This acid is best administered hypodermatically in doses of from $\frac{1}{50}$ to $\frac{1}{12}$ of a grain (0.0013 to 0.0054 gramme). Internally, it may be given in pill form in the same quantities.

OUABAÏN.

This is the glucosidal principle of the ouabaïo plant, *Acocanthera ouabaïo* or *Carissa shimperi*, belonging to the *Apocynaceæ*. This glucoside is said to be obtained also from the seeds of *Strophanthus glabrus*. This principle has the chemical composition $C_{30}H_{46}O_{12}$.

Physical Properties.—*Ouabaïn* is a white crystalline body, without odor, and having a slightly bitter taste. It has a melting-point of 392° F (200° C.).

Solubility.—This drug is readily dissolved in hot water and in spirit, sparingly soluble in cold water, but insoluble in alcohol, chloroform, and anhydrous ether.

Physiological Action.—The general action of ouabaïn is similar to that of strophanthine.

Circulation.—The heart is slowed at first, owing to a stimulation of the cardio-inhibitory apparatus and to a direct cardiac action. The pulse is afterward decreased in rate, from depression and final paralysis of cardio-inhibitory function. The blood-pressure is primarily increased through vaso-motor spasm, centrally and peripherally; it is secondarily decreased by cardio-inhibitory stimulation; and is again increased, due partly to increased heart-action and continued vaso-motor spasm. Poisonous doses paralyze the heart-muscle and the vaso-motor system.

Respiration.—The action of ouabaïn on this function is irregular. Respiration appears, however, to be generally primarily increased in rate and secondarily diminished, in both cases by a centric action.

Nervous System.—Ouabaïn decreases and finally abolishes reflex action, chiefly by paralyzing the sensory nerves. The motor nerves are also paralyzed by poisonous amounts of this drug, especially when applied locally. This agent apparently has no action on the central nervous system.

Muscular System.—The striated muscles are paralyzed by a direct action of ouabaïn.

Eye.—This drug causes pronounced corneal anæsthesia, and it is stated that it also produces contraction of the pupil accompanied with an increase of intra-ocular tension and enlargement of the eyeball.

Digestive Tract.—Ouabaïn produces emesis by a centric influence, and increases peristaltic movements.

Urine.—This drug acts as a diuretic, probably through increased blood-pressure.

Therapeutic Applications.—Although ouabaïn is a local anæsthetic to the conjunctiva and cornea, it has not been employed as such. This drug has been used internally, principally as a powerful antispasmodic, and is said to be of especial value in the treatment of whooping-cough of children.

Administration.—The dose of ouabaïn is $\frac{1}{1000}$ of a grain (0.00004 gramme) every three hours for a child five years of age.

PAMBOTANO.

This plant is the *Calliandra houstoni* of the *Leguminosæ* family. No thorough chemical analysis of it has as yet been made.

Therapeutic Applications.—This drug is claimed to be of service as an antiperiodic in the treatment of neuralgias, and especially of fevers of malarial origin. It has been employed with asserted good results in diseases

of the eye, such as opacities of the cornea, and in leucorrhœa, diarrhœa, and dysentery. As an expectorant it is said to be of service in allaying, and even in curing, coughs.

Administration.—The preparation in use at present is a decoction or an elixir, the dose of which varies from 1 to 2½ ounces (30 to 75 grammes).

PAPAYOTIN.

Papayotin, known also as *papain* and *papoid*, is an active principle chiefly obtained from the unripe fruit of the *Carica papaya*.

Physical Properties.—Papayotin occurs in the form of a white, amorphous, odorless, crystalline, hygroscopic powder.

Solubility.—Papain is soluble in water and in glycerin, but is insoluble in alcohol, ether, and chloroform.

Physiological Action.—Recent researches have shown that papayotin is a true soluble digestive ferment, having marked proteolytic action in acid, alkaline, and neutral solutions and in the presence of many chemicals and antiseptic and therapeutic agents. It softens and disintegrates proteids, its general proteolytic action being similar to that of a genuine digestive animal ferment. It is said that papoid will peptonize two hundred times its own weight of fresh blood-fibrin, and that seven grains of it will digest in one and a half hours a pint of milk. This drug is alleged also to exercise a certain amount of amylolytic power, and it is said that its action is not checked by the ordinary conditions of health and disease in the gastro-intestinal tract.

Therapeutic Applications.—Papoid has been used with asserted success as a powerful digestive agent in dyspepsia and catarrh of the stomach, especially when there is a deficiency of the gastric juice. It is of value in constipation due to indigestion, in diarrhœa, and in most other gastro-intestinal troubles. It may, in fact, be used with advantage in all those cases in which pep-

sin is indicated. Papayotin has likewise been employed as a local remedy in diphtheria and croup, to dissolve the membranes. It has been recommended as a solvent of cerumen. This remedy has been used with marked success in the treatment of fissure of the tongue when other agents, such as iodoform, chromic acid, and nitrate of silver, have failed. Its employment in the treatment of syphilitic ulcerations of the tongue has given beneficial results.

Administration.—The dose of papain is from 1 to 5 grains (0.06 to 0.3 gramme), and it is probably best administered in the form of lozenges. Locally, this drug may be employed in solutions of the strength of 5 per cent., the applications being carefully made every ten to fifteen minutes.

PARACOTOIN.

This principle, allied to cotoin, is obtained from the bark of the para-coto plant, supposed to be the *China coto*. Chemical analysis represents the drug as having a composition of $C_{19}H_{12}O_6$.

Physical Properties.—This medicament appears as a yellowish crystalline powder without odor or taste.

Solubility.—This drug is quite readily soluble in alcohol, but difficultly so in ether and in water.

Therapeutic Applications.—*Paracotoin* is highly spoken of as a valuable remedy in diarrhœa, being also beneficial in the simple forms of gastric and intestinal catarrhs. It is likewise said to be of service in the diarrhœa and night-sweats of phthisical patients. It has been tried successfully in the treatment of Asiatic cholera.

Administration.—Paracotoin is given in the powdered form or in mixture, the dose being from 2 to 3 grains (0.12 to 0.18 gramme).

PARACRESALOL.

This substance, also designated by the name of *cresalol*, is the *salicylate of paracresol*, whose composition is represented by the formula C_6H_4-OH,COO,C_6H_4,CH_3.

Physical Properties.—*Paracresalol* occurs as a white crystalline powder with an odor resembling that of salol. It melts at 98.8° F. (36° C.).

Solubility.—This drug is slightly soluble in alcohol, but is insoluble in water.

Therapeutic Applications.—*Cresalol* is analogous to salol in its therapeutic uses; it is of especial value as an intestinal antiseptic.

Administration.—The dose of this drug, best given in wafers, is from 3 to 30 grains (0.20 to 2 grammes) during the day.

PARAFORM.

Paraform is the name given to *polymeric formic aldehyde*.

Physical Properties.—*Paraform* occurs in the form of a white crystalline substance.

Solubility.—This drug is insoluble in water.

Physiological Action.—Small doses of paraform are said to constipate, while larger quantities cause diarrhœic stools. The drug resembles calomel in its action. Solutions of the strength of 1 : 50,000 are sufficient to arrest the growth of the typhoid bacillus. When introduced into the system this medicament is thought to be volatilized in part, from the fact that when exposed outside of the body to a temperature of 100.4° F. (38° C.) it loses about ten per cent. of its weight.

Therapeutic Applications.—Paraform has been found of service as a disinfectant and antiseptic. As it is said to retain its activity while in the form of vapor, it is believed to be of advantage in disinfecting surgical dressings, instruments, and even the operating-room. This remedy has been employed as a disinfectant of the intestinal tract; it has rendered marked service in the treatment of cholera nostras in children.

Administration.—Paraform may be given in single doses of from 7½ to 15 grains (0.5 to 1 gramme), in the form of pills or in capsules.

Toxicology.—This new drug is non-poisonous. As high as 75 grains (5 grammes) of paraform have been given to an adult without causing any disagreeable effects whatever.

PARALDEHYDE.

Paraldehyde, also termed *paraldehydum* and *eladdehyde*, is a polymeric modification of acetic aldehyde, a product resulting from the condensation of three molecules of ethyl aldehyde, its formula being $(C_2H_4O)_3$ or $C_6H_{12}O_3$.

Physical Properties.—*Paraldehyde* is a colorless liquid having a disagreeable ethereal odor and a burning taste; it boils at 255° F. (124° C.), crystallizes at 50° F. (10° C.), and has a sp. gr. of 0.998.

Solubility.—*Eladdehyde* is soluble in alcohol, ether, and the fixed oils; also in water at 60° F. (15.5° C.), in the proportion of 1 to 10.

Therapeutic Applications.—Paraldehyde is chiefly employed as a hypnotic and antispasmodic. As a sleep-producing agent it is quite efficient, the characteristic effects becoming manifest in from five to fifteen minutes. It has produced excellent results in asthma, and in those cases of simple insomnia accompanied with convulsive symptoms, such as cough and other distressing phenomena. The drug relieves particularly the nervous insomnia of insanity.

Administration.—This medicament is best given diluted, combined with some bitter tincture, in spirits, or in emulsion, by the rectum or by the mouth. The dose of it varies from 30 to 60 minims (2 to 4 grammes).

PARTHENICINE.

The alkaloid of *Parthenium hysteriophorus*.

Therapeutic Applications.—This drug has not been sufficiently studied, but is said to possess antineuralgic properties.

PELLETIERINE TANNATE.

The alkaloid of the pomegranate-bark, or *Punica granatum*, *pelletierine* ($C_8H_{15}NO$), is a colorless liquid which forms salts with the acids. The chief salts known are the *hydrobromate*, the *hydrochlorate*, the *sulphate*, and the *tannate*, the last one being represented by the formula $C_8H_{13}NO.C_{14}H_{10}O_9$.

Physical Properties.—This salt is an odorless, yellowish, hygroscopic powder having a pungent and astringent taste.

Solubility.—This drug is soluble in 80 parts of alcohol and in 700 parts of water.

Therapeutic Applications.—*Tannate of pelletierine* has been chiefly employed as an excellent and prompt tæniacide.

Administration.—This remedy is best given in single doses of 23 grains (1.5 grammes) in about an ounce of water, followed by a cathartic.

PENTAL.

This drug is the *trimethylethylene* or the *beta-isoamylene*, whose chemical composition is represented by the formula $(CH_3)_2C.CH.,CH_3.$, or C_5H_{10}.

Physical Properties.—Pental is a colorless liquid with a melting-point of 100.4° F. (38° C.) and a sp. gr. of 0.678. It is highly inflammable, burning with an illuminating flame. It is exceedingly volatile, but does not decompose on exposure to light or to the atmosphere.

Solubility.—This drug is soluble in alcohol, ether, and chloroform, but is insoluble in water.

Physiological Action.—*Nervous System.*—This agent has general anæsthetic properties and a slight local influence. It seems to act centrally. The anæsthesia is rapidly produced, but it also quickly disappears.

Circulation.—Both the blood-pressure and the rate of the pulse are depressed by pental. These phenomena

are chiefly due to a cardiac influence. This drug appears to be a heart-poison, and death is generally caused by cardiac failure.

Respiration.—The rate of the respiratory movements at first is increased, followed by a decrease. This function is dangerously disturbed by pental.

Pupil.—The pupil is dilated under the influence of the drug, this phenomenon probably being of a centric origin.

Therapeutic Applications.—The chief use of pental is that of an anæsthetic, but as such it is not so efficient as ether or chloroform; besides, the drug in question has a tendency to depress the circulation to a dangerous degree. It has been employed chiefly in minor surgical operations, such as opening buboes, abscesses, etc., and in dental practice.

Administration.—Pental may be administered by inhalation in doses of from 1¼ to 2½ drachms (5 to 10 grammes). As a local remedy it may be applied in the form of a spray.

Toxicology.—The narcosis produced by pental is not unattended by deleterious effects. This drug has already caused death in the human being. Among the disagreeable after-effects of this agent may be mentioned nervous excitability, tremors of the extremities, a staggering gait, difficulty of speech, dizziness, redness of the face, and headache. This drug has caused erythema, and even tetanic spasms. There is often produced by this medicament the Cheyne-Stokes type of respiration, this phenomenon being exceedingly dangerous. It is asserted also that albumen and blood in the urine have appeared after pental narcosis.

PEREIRINE.

An alkaloidal principle obtained from *Pao pereiro* so called, or *Geissospermum lævæ*, belonging to the *Apocynaceæ*. No thorough chemical study of this alkaloid has been published. Two salts, the *hydrochlorate* and

the *valerianate*, have been tried in practical menicine, especially the latter one.

Physical Properties.—*Pereirine valerianate* occurs as a brown crystalline powder.

Solubility.—This drug is freely soluble in alcohol, scarcely so in water, and insoluble in ether.

Therapeutic Applications.—*Valerianate of pereirine* has been used with asserted good results as an antipyretic, especially in diseases of malarial origin.

Administration.—This remedy may be given in powder, in single doses of as high as 30 grains (2 grammes), a few hours before the expected paroxysm in the intermittent type of the disorder.

PHELLANDRIUM.

This plant, *Phellandrium aquaticum*, recently introduced into practical therapeutics, has not as yet been thoroughly studied. Attention has been called, however, to its medicinal virtues, it having been found to be of value in diseases of the respiratory tract, such as bronchitis. It is claimed to be a specific sedative to the bronchial mucous membrane.

PHENACETIN.

This medicinal agent is a derivative of coal-tar. It is called also *acetphenetidin* and *phenacetieum*. Its chemical nature is represented by the formula $C_6H_4OC_2H_5$-$NHCH_3CO$.

Physical Properties.—*Phenacetin* is a tasteless, inodorous powder made up of scaly crystals having a melting-point of 275° F. (135° C.).

Solubility.—This drug is soluble in alcohol, more or less soluble in boiling water, and but sparingly soluble in cold water and in glycerin. Rectified spirit dissolves it in the proportion of 1 to 16 parts.

Physiological Action.—*Nervous System.*—The action of phenacetin on the nervous system is not well known. There is reason to believe, however, that as a sedative

this agent acts particularly on the sensory portion of the cord.

Circulation.—Small doses of this drug stimulate the circulation, causing a rise of the arterial pressure, acceleration of the pulse-rate, and an increase of the cardiac force. Large amounts are depressant. To produce these phenomena this agent acts chiefly upon the heart. Phenacetin causes a chocolate or dark color of the blood, said to be due to methæmoglobin.

Respiration.—This function is stimulated, through a centric action, by large quantities of the drug. Moderate doses have no effect on respiration.

Urine.—This liquid becomes dark yellow under the influence of phenacetin, and responds to sugar reactions. Phenacetin is said to act somewhat as a diuretic.

Temperature.—Phenacetin does not seem to affect normal temperatures. In fever this drug reduces the heat mainly by decreasing its production. Phenacetin apparently also increases, though slightly, heat-dissipation.

Therapeutic Applications.—Phenacetin is useful as an analgesic and an antipyretic. It is considered in many respects superior to, and the safest of, the coal-tar derivatives. As an antipyretic it has been employed with apparent success in typhus and typhoid fevers, in phthisis, and in other febrile disorders. As an analgesic good results have been produced by it in the treatment of neuralgia, migraine, whooping-cough, articular rheumatism, and influenza. This medicament is certainly of value in the insomnia caused by a high febrile state. Locally, it has been used in the treatment of acute rhinitis.

Administration.—The dose of phenacetin varies from 3 to 15 grains (0.19 to 1 gramme). Even so high a dose as 90 grains (6 grammes) has been administered. The drug is best given in cachets or suspended in mucilaginous drinks. The powder may be applied locally.

Toxicology.—Untoward effects may follow the use of phenacetin, these consisting of dyspnœa, precordial pain,

profuse cold sweating, a sluggish circulation—in fact, all the symptoms of collapse. Dilatation of the pupil sometimes occurs. Red spots on the extremities and large wheals have been observed after the use of phenacetin.

PHENIDIN.

This substance is allied to phenacetin, and is also known as *para-acetphenitidin.*

Therapeutic Applications.—This remedy is lauded as a valuable analgesic, being considered superior to antipyrin.

Administration.—*Phenidin* is given in single doses of 15 grains (1 gramme), and may be repeated until three or four doses are taken.

PHENOCOLL.

This new antipyretic remedy, closely allied to phenacetin, is obtained by the interaction of para-amido-phenotoll and glycocoll, its formula being

$$C_6H_4\begin{cases}OC_2H_5\\NH,COCH_2NH_2\end{cases}+H_2O.$$

The drug used in practical medicine is the *hydrochloride* or *hydrochlorate*, and it is then represented as

$$C_6H_4\begin{cases}OC_2H_5\\NH,COCH_2NH_2HCl.\end{cases}$$

Physical Properties.—This salt occurs as a white crystalline powder. The water compound melts at 203° F. (92° C.), but the anhydrous base requires a temperature of 212.9° F. (100.5° C.).

Solubility.—This drug is readily soluble in water and in alcohol, but only barely soluble in chloroform, ether, and benzol.

Physiological Action.—*Nervous System.*—Phenocoll

causes paraplegia, and destroys sensation and motion when given in sufficiently large doses, especially by influencing the cord.

Circulation.—Small quantities have no effect on the circulation; large amounts, however, diminish the blood-pressure and the pulse-rate through a cardiac action. This drug exercises no influence upon the blood itself.

Respiration.—Respiration may be slightly accelerated at first, but is generally depressed under the full action of phenocoll.

Temperature.—Phenocoll does not seem to affect normal temperature. It decidedly reduces the heat of fever, however, the reduction being due mainly to an enormous diminution of heat-production.

Therapeutic Applications.—*Phenocoll hydrochlorate* has valuable therapeutic properties. It has produced excellent results as an antipyretic in febrile disorders such as typhoid, in phthisis, and in other pulmonary affections; as an antirheumatic in many of the acute forms of rheumatism; and as an antineuralgic, especially in cases of a hysterical nature. This drug has likewise been found beneficial in malaria and in influenza. The antimalarial action of phenocoll appears to have been established by recent trials; in fact, it has been found superior to quinine in a large number of instances, with the advantage that the new remedy does not produce toxic symptoms. Tinnitus aurium and skin eruptions, as in the case of quinine, have not been observed under the use of phenocoll. This medicament is claimed to be as valuable an antiseptic as iodoform, and as such phenocoll has been locally applied with satisfactory results in wounds, cutaneous eruptions, acute gonorrhœa, leucorrhœa, and other similar disorders.

Administration.—The dose of *phenocoll hydrochloride* is from 10 to 15 grains (0.65 to 1 gramme) three to five times a day, and it may be administered in the powdered form, in aqueous solutions, or in capsules. For local purposes it may be employed in aqueous solution of the

strength of 5 or even 10 per cent., and in ointment with lanolin in the strength of 20 per cent.[1]

PHENOSALYL.

This new antiseptic combination is obtained by heating together carbolic, salicylic, and lactic acids, and adding, when cold, a mixture of menthol and eucalyptol in glycerin.

Physical Properties.—This drug occurs in the form of a clear syrupy liquid which crystallizes at low temperatures.

Solubility.—Phenosalyl is readily soluble in warm water, alcohol, and ether, and soluble in cold water in the proportion of 7 to 100 parts.

Therapeutic Applications.—Phenosalyl is said to be less poisonous than carbolic acid, and is a more effective germicide. This new remedy has been employed with satisfactory results as an antiseptic in obstetric practice. In the form of injections, the use of phenosalyl in bad cases of purulent cystitis has been attended with excellent results. This agent has also been tried with good effect in metritis and endometritis, in cutaneous diseases, particularly eczematous impetigo, in blepharo-adenitis, and even in conjunctivitis.

Administration.—This drug can be applied in solutions of the strength of from 1 to 2 per cent. In eye-affections weaker solutions are preferable—that is, from

[1] Other salts of phenocoll, such as the *acetate*, the *carbonate*, and the *sali cylate*, are found upon the market, but the first two have not been tried clinically. The salicylate, however, under the name of *salocoll*, is said to have a sweetish taste and to be less soluble than the hydrochloride. It has recently been recommended as an efficient neuralgic and antirheumatic in doses of from 15 to 30 grains (1 to 2 grammes). In influenza salocoll is claimed to have acted almost as a specific. *Phenuretin* is a derivative of phenocoll only recently introduced, the chemical nature of which has not yet been determined. It occurs in the form of white, silky, acicular crystals, without taste. This new agent is soluble in hot water, but scarcely so in cold water. This drug possesses diuretic virtues, and has been found to act favorably in migraine. The dose of phenuretin is set down as from 5 to 15 grains (0.3 to 1 gramme) twice a day, and it is best given in capsules.

0.2 to 0.4 per cent. For application in uterine troubles pencils of the strength of from 2 to 10 per cent. may be employed.

PHENYL-SALICYLIC ACID.

Also termed *ortho-oxy-diphenyl-carbonic acid*, and said to be represented by the formula H_5C_6-OH,H_3C_6.CO.OH.

Physical Properties.—*Phenyl-salicylic acid* occurs in the form of a white powder.

Solubility.—Ortho-oxy-diphenyl-carbonic acid is soluble in alcohol, ether, and glycerin, but is only slightly soluble in water.

Therapeutic Applications.—This new acid is claimed to possess antiseptic properties, its bactericidal power being as great as that of salicylic acid. It is suggested as a local remedy, since its difficult solubility prevents it from producing poisonous effects. This acid, especially its sodium salt, is at present only being studied, and therefore nothing definite can be stated as regards its internal administration.

PHLORIDZIN.

A glucosidal principle obtained from the bark of the apple, pear, and other fruit-trees. Its chemical composition is $C_{21}H_{24}O_{10}$.

Physical Properties.—This drug occurs in small white, silky, crystalline needles with a melting-point of from 222.8° to 226.4° F. (106° to 108° C.); at 226° F. (130° C.) it becomes solid, and it again melts at from 338° to 339.8° F. (170° to 171° C.).

Solubility.—This remedy is soluble in hot water and in alcohol.

Therapeutic Applications.—*Phloridzin* has been recommended as an antipyretic, but as such is not largely used. This drug is said to produce in animals artificial diabetes.

Administration.—This medicament may be given in daily doses of from 15 to 30 grains (1 to 2 grammes).

PHOTOXYLIN.

This substance, a nitro-cellulose, is obtained from wood-wool.

Therapeutic Applications.—*Photoxylin* is chiefly employed in plastic surgery, in solutions of the strength of from 3 to 5 per cent., made in mixtures of equal parts of alcohol and ether. It is said to be superior to collodion.

PHYTOLACCA.

The common name of pokeroot is given to several species of *Phytolacca*, of which the ones principally used at present in medicine are *Phytolacca acinosa* and *Phytolacca decandra*. No thorough studies have been made in regard to the chemical constitution of these plants.

Therapeutic Applications.—*Phytolacca* has purgative, emetic, and to a certain extent narcotic properties. The *acinosa* species has of late been recommended in dropsy. It has been tried with success in the treatment of mammary abscesses.

Administration.—The preparations used at present are a decoction and a fluid extract. Of the latter the dose is put down as 10 minims (0.65 gramme) three times a day.

PICHI.

Fabiana imbricata, a plant belonging to the *Solanaceæ* family, is designated by the common name of *Pichi*. This plant has not been examined thoroughly, but it is said to contain, besides many other principles, a crystallizable alkaloid termed *fabianine*.

Therapeutic Applications.—*Fabiana* is lauded as an efficient remedy in affections of the urinary tract, such as acute and chronic vesical catarrh, uric-acid diathesis, etc. It is said to increase biliary secretion and to be of service in jaundice and dropsy of hepatic origin.

Administration.—The only preparation used so far is a decoction made of the strength of 20 : 1000, the dose of which is from 2 to 3 cupfuls a day.

PICROTOXIN.

A principle obtained from the seeds of *Anamirta paniculata*. It is said to be found also in the fruit of *Anamirta cocculus*. Its chemical constitution is given as $C_{12}H_{16}O_7Aq$.

Physical Properties.—This drug occurs in brilliant colorless needles.

Solubility.—This principle is soluble in alcohol, and somewhat so in water and in ether.

Therapeutic Applications.—*Picrotoxin* has been prescribed in hysteria, epilepsy, spinal paralysis, and in chorea, in all of which affections it is said to have produced good results. It has also been recommended in the treatment of the night-sweats of phthisis. As a local remedy it has been employed with asserted success in parasitic diseases of the skin.

Administration.—The dose of picrotoxin is put down as from $\frac{1}{100}$ to $\frac{1}{10}$ of a grain (0.00065 to 0.0065 gramme). Locally, an ointment of the strength of from 3 to 5 in 250 parts may be employed.

PILIGANINE.

An active principle extracted from *Lycopodium saururus*, a plant belonging to the *Lycopodiaceæ*, and known by the vulgar name of *Piligan*. It is said to be contained also in the species *Lycopodium selago*.

Physical Properties.—*Piliganine* occurs as a yellowish transparent mass with a repugnant odor. With the acids it forms salts of which the one best known is the *hydrochlorate*.

Solubility.—This drug is soluble in water and chloroform, and partly soluble in ether.

Therapeutic Applications.—*Hydrochlorate of piliganine* possesses emetic and cathartic virtues, but it has chiefly been employed, though not extensively, against tænia and as an antispasmodic in the treatment of asthma.

Administration.—The dose of *piliganine hydrochloride*

may be set down as from $\frac{1}{6}$ to $\frac{1}{3}$ of a grain (0.01 to 0.02 gramme).

PIPERAZIN.

Also termed *piperazidin*, *diethylenediamin*, *dispermin*, and *ethylenimin*; obtained by the action of ammonia on bromide or chloride of ethylene, its chemical nature being represented by the formula $C_4H_{10}N_2$.

Physical Properties.—This drug is a crystalline body having a melting-point of from 219.2° to 224.6° F. (104° to 107° C.); it boils at 292° F. (145° C.). The aqueous solution is practically tasteless.

Solubility.—*Piperazin* is exceedingly soluble in water.

Physiological Action.—No researches have been made to determine the exact action of this agent. It is said, however, that the drug enters into combination with uric acid to form the urate of piperazin, yet there is an increase in the amount of urea with a corresponding diminution in the elimination of uric acid. This fact indicates that the process of oxidation is quite complete. The affinity of piperazin for uric acid promotes the transformation of this acid into urea.

Therapeutic Applications.—The chief and most valuable use of *piperazidin* in medicine is as a solvent for uric-acid and urate concretions, in which action it has, up to the present time, no rival as a medicament with this power. It is undoubtedly an invaluable remedy in gout, rheumatic arthritis, and other similar affections. It has produced excellent results in the pruritus of the uric-acid diathesis. The use of the drug is said to have been of service in the treatment of renal colic and in urinary hemorrhage. Hypodermatic injections into gouty deposits, and even local applications to gouty swellings, are recommended. Piperazin has given good results in the treatment of diabetes.

Administration.—The dose of piperazin is 15 grains (1 gramme). It may be administered by the stomach and subcutaneously. The remedy can also be applied

locally in 1 or 2 per cent. solutions mixed with water and spirit, 1 to 4 respectively.[1]

PIPERINE.

An alkaloidal principle obtained from the fruit of *Piper nigrum*, or common black pepper. Its chemical composition is $C_{17}H_{19}NO_3$.

Physical Properties.—*Piperine* when pure is colorless and has practically no taste. It generally occurs as a yellowish resin with a pungent taste.

Solubility.—This drug is readily soluble in sulphuric and acetic acids, somewhat soluble in alcohol, but insoluble either in cold or hot water or in ether.

Therapeutic Applications.—Piperine has been employed as an antipyretic and laxative; its use, however, has not been extensive.

Administration.—The dose of this remedy, given in powder or in pill form, is from 1 to 10 grains (0.06 to 0.65 gramme).

PIPERONAL.

This drug is known also under the name of *heliotropin*. It is obtained from *piperic acid* by oxidation, and has the composition $C_8H_6O_3$.

Physical Properties.—This substance appears in the form of small white crystals.

Solubility.—*Piperonal* is soluble in alcohol and ether, but not in water.

Therapeutic Applications.—This remedy has been proposed as an antipyretic and antiseptic, but its use is

[1] *Beta-nitrophenylpiperazin*, with a melting-point of 264.2° F. (120° C.), *diacetylpiperazin*, with a formula of $CHN.2CHO$ and a melting point of 271.3° F. (138.5° C.), and other derivatives of piperazin and allied compounds have been prepared, but have not yet been tried in practical medicine. To the *tartrate of dipropylenediamin*, or *dimethylpiperazin*, the common name of *lycetol* has been given. This drug is said to undergo oxidation in the organism into a carbonate, and to thus alkalinize the blood. It is asserted to have done good in gouty diseases, but the reports as to the therapeutic value of this agent are as yet insufficient.

not large—owing, probably, to its high price. At present it is generally employed in the arts, especially in the manufacture of perfumery.

Administration.—Piperonal may be given in single doses of 15 grains (1 gramme).

PISCIDIA.

The vulgar name of "Jamaica dogwood" is given to *Piscidia erythrina*, the constituents of which have not so far been determined accurately.

Therapeutic Applications. — This plant possesses powerful sedative properties which in many instances are considered superior to those of opium. It is a most valuable agent against irritation of the nervous centres, especially in those cases that will not tolerate the action of the papaver. The calmative and hypnotic effects of piscidia have been most beneficial in many forms of rebellious neuralgias.

Administration.—The best preparation of the plant now in vogue is the fluid extract, the dose of which is from $\frac{1}{2}$ to 1 drachm (1.90 to 3.80 grammes).

PODOPHYLLOTOXIN.

This body is said to be the active principle of the common *May-apple* (*Podophyllum peltatum*); its chemical nature has not yet been investigated thoroughly.

Therapeutic Applications.—The chief use of *podophyllotoxin* is as a purgative and a hepatic stimulant.

Administration.—The dose of this remedy varies from $\frac{1}{100}$ to $\frac{1}{10}$ of a grain (0.0054 to 0.006 gramme).[1]

POLYGONUM.

Many species of this plant have been found to possess medicinal virtues, especially *Polygonum hydropiperoides* and *Polygonum punctatum.*

[1] A neutral crystalline principle, alleged to be the chief constituent of podophyllin, has been described under the name of *picropodophyllin*, whose therapeutic properties are said to be similar to those of podophyllotoxin.

Therapeutic Applications.—*Polygonum* is considered an excellent emmenagogue, and as such it has been employed with the most satisfactory results.

Administration.—The preparation of polygonum used at present is the fluid extract, the dose of which is from 15 to 30 minims (0.95 to 1.90 grammes).

POTASSIUM TELLURATE.

This new salt of potassium is represented by the formula K_2TeO_4.

Physical Properties.—This drug appears as a white crystalline powder.

Solubility.—This salt is soluble in water.

Therapeutic Applications.—*Tellurate of potassium* has been found quite effective as an antihydrotic in pulmonary consumption, but, although the night-sweats are reduced and even arrested, the disease itself is not modified under the action of the drug.

Administration.—This remedy is best given at night, in pill form or in alcoholic julep, in doses of from $\frac{1}{2}$ to $\frac{3}{4}$ of a grain (0.03 to 0.05 gramme).[1]

PYOKTANIN.

Two aniline dyes are known under the above term—the true *methyl-violet* or *yellow pyoktanin* and the so-called *blue pyoktanin*. They are derivatives of a diphenylamin compound. The methyl-violet is the one more largely used in practical medicine.

Physical Properties.—Pyoktanin occurs in the form of an odorless powder.

Solubility.—This drug is largely soluble in alcohol; it is soluble also in 75 parts of cold and in 50 parts of hot water.

[1] Other salts of potassium have recently been introduced. Of these salts there are: the white crystalline *auro-cyanide* ($KAuCy_4$) and the *mercuric cyanide* (K_2HgCy_4), used as disinfectants; the *cobalto-nitrite* ($K_6CO_2(NO_2)_{12}.2Aq.$), composed of yellow crystals, recommended in cases in which the nitrites are indicated, such as cardiac dropsy, dyspepsia, etc.; and the *osmate*, employed for the same purposes as osmic acid (*q. v.*) itself.

Physiological Action.—This agent stains the skin. Unlike other germicides, it does not coagulate albumin. Locally applied, it is a strong irritant. Internally, given in sufficiently large amounts, it has a sedative effect on both motor and sensory nerves. It produces at first a slight increase of the reflexes. It also causes a condition of methæmoglobinuria.

Therapeutic Applications.—Pyoktanin has been employed extensively as a general antiseptic in the local treatment of ulcers and chancres, and also in that of whitlow and anthrax. It is said to be of value in diseases of the eye, such as parenchymatous keratitis, ophthalmia, corneal ulcers, choroiditis, purulent conjunctivitis, iritis, tinea tarsi, and particularly in sloughing keratitis; in affections of the ear, such as otitis media; in diseases of the nose and throat, such as nasal diphtheria and ozæna of whatever nature, aphthæ, purulent discharges, and tubercular ulcerations of the soft palate. Pyoktanin has rendered good service in epithelioma and in many parasitic disorders of the skin. This drug, subcutaneously injected, is alleged to have produced good results in the treatment of malignant growths, such as carcinoma and sarcoma. It is lauded as a most efficient analgesic, and it is reported to be of special value in acute articular rheumatism, ataxia, and alcoholic neuritis, and in a large variety of neuralgias. This medicament has produced good results in the treatment of gonorrhœa.

Administration.—This remedy is given by the mouth, in doses of from 1 to 7½ grains (0.06 to 0.5 gramme), and even as high as 15 grains (1 gramme), a day. Hypodermatically, about ⅘ of a minim (0.05 gramme) of a 2 per cent. solution can be given. For local use watery solutions of the strength of 1 : 3000 or 1 : 1000 may be employed. Pencils of pyoktanin are also used for local applications.

Toxicology.—Pyoktanin is apt to cause poisonous symptoms. The most frequent untoward effects observed under the use of the drug have been nausea, diarrhœa,

and headache. Pyoktanin has caused violent gastro-intestinal irritation accompanied with albuminuria.

PYRAZOL.

This is the *phenylmethylpyrazol-carbonic acid*, recently tried in practical medicine.

Therapeutic Applications.—This acid is said to possess a composition similar to that of antipyrin, yet it lacks antipyretic properties. Pyrazol has been used as a diuretic, and its effects are said to have been satisfactory.

Administration.—The dose of this remedy is from 15 to 30 grains (1 to 2 grammes).

PYRIDIN.

This substance, which must not be confounded with *pyrodin* (hydracetin), is obtained from bone-oil by the action of sulphuric acid. Its composition is represented by the formula C_5H_5N. Bases of pyridin occur in tobacco-smoke.

Physical Properties.—When pure, *pyridin* is a colorless liquid with a peculiar odor and a pungent taste. It boils at 242.6° F. (117° C.); its sp. gr. at 32° F. (0° C.) is 0.9858.

Solubility.—This drug is readily soluble in water.

Therapeutic Applications.—*Pyridin* has given good results in the treatment of angina pectoris and asthma, and is said also to be an effective cardiac stimulant. Gonorrhœa is said to be benefited by this drug.

Administration.—The dose of this medicament is from 2 to 4 minims (0.12 to 0.24 gramme) thrice daily. It is best administered, however, by inhalation (1 to 1½ drachms (3.75 to 5.66 grammes) being placed on a dish in the room of an asthmatic patient—a quantity which is evaporated in about one or one and one-half hours). For local injections, as in gonorrhœa, the watery solution may have a strength of 1 : 300.

PYROCATECHIN.

This body is isomeric with resorcin, its formula being $C_6H_4(OH)_2$.

Physical Properties.—This drug occurs in the form of acicular crystals having a melting-point of 219.2° F. (104° C.); it boils at from 464° to 473° F. (240° to 245° C.).

Solubility.—*Pyrocatechin* is soluble in water, alcohol, and ether.

Therapeutic Applications.—This remedy has been tried as an antipyretic, but its use has not become popular.

QUASSIIN.

A bitter principle extracted from quassia (*Picræna excelsa*), being chemically constituted as $C_{41}H_{42}O_9$.

Physical Properties.—*Quassiin* is a crystalline body.

Therapeutic Applications.—This remedy has been recommended as a stomachic tonic and as a stimulant to digestion.

Administration.—The dose of quassiin is from $\frac{1}{30}$ to $\frac{1}{3}$ of a grain (0.002 to 0.02 gramme).

QUEBRACHINE.

An alkaloid obtained from the bark of the quebracho plant. The salt recently introduced into practical medicine is the *hydrochloride*, with a formula of $C_{21}H_{26}N_2O_3,HCl$.

Therapeutic Applications.—This salt has been employed in the treatment of dyspnœa with asserted success (see *Aspidospermine*).

Administration.—*Quebrachine hydrochloride* is administered by the mouth or hypodermatically, in doses of from 1 to 2 grains (0.06 to 0.12 gramme).

QUEBRACHO.

The *Aspidosperma quebracho*, containing many active principles.

Therapeutic Applications.—This plant is chiefly employed as an antithermic.

Administration.—The powder is given in doses of from $4\frac{1}{2}$ to $7\frac{1}{2}$ grains (0.30 to 0.50 gramme); the tincture, in doses of $\frac{1}{2}$ to 1 drachm (2 to 4 grammes).

QUINIDINE.

This alkaloid is extracted from the bark of several species of *Cinchona*, especially *Cinchona pitayensis*. A salt that is now used in medicine is the *tannate*, represented by the formula $(C_{20}H_{24}N_2O_2)_2C_{27}H_{22}O_{17}$.

Therapeutic Applications.—The salt, almost destitute of taste, has been highly recommended as a tonic in dyspepsia. It has been successfully used also in diarrhœa, albuminuria, and nephritis.

Administration.—The dose of the *tannate of quinidine* is from 3 to 12 grains (0.18 to 0.72 gramme) twice or four times a day.

QUININE.

The new salts of this alkaloid are almost legion in number, but not one has claimed a special use in medicine. They have been tried only as substitutes for the chief principle of cinchona. Two of these salts, however, have of late been employed with apparent good results: the *oleate*, occurring as a yellowish-gray mass, soluble in alcohol, and applied locally in the form of suppositories and of ointments in the treatment of cutaneous affections; the *salicylate*, appearing as a fine white powder, soluble in alcohol, but difficultly soluble in water; it possesses antiseptic and antipyretic properties, and is said to be of service in typhus and typhoid fevers, articular rheumatism, and other febrile disorders. This salt is given in doses of from 1 to 8 grains (0.06 to 0.48 gramme).

QUININE CHLORHYDRO-SULPHATE.

This new double salt of quinine, which contains 74.2

per cent. of the alkaloid, is represented by the formula $(C_{20}H_{24}N_2O_2)2HCl,SO_4H_2,3H_2O$.

Solubility.—This remedy is soluble in water in the proportion of 1 to 1.

Physiological Action.—The action of this double salt is similar to that of quinine itself.

Therapeutic Applications.—*Chlorhydro-sulphate of quinine* has given excellent results as a substitute for the sulphate or the chlorhydrate. It has been employed hypodermatically, and is said to be rapidly absorbed. The injections are, it is assured, painless.

QUINOIDIN.

Quinoidin is a mixture of amorphous alkaloids occurring in the preparation of the active principles of cinchona.

Physical Properties.—This mixture occurs as a brownish-black mass having a nauseous taste.

Solubility.—This drug is soluble in water made slightly acid.

Therapeutic Applications.—*Quinoidin* is mainly employed as a substitute for quinine, and in similar doses.[1]

RANDIA.

This East-Indian plant (*Randia dumetorum*) has of late claimed the attention of physicians as a therapeutic agent of some value. No thorough chemical study of it has yet been made, although it is said to contain valerianic acid and a glucosidal principle allied to *saponin*.

Therapeutic Applications.—*Randia* has been em-

[1] Two salts of quinoidin, the *borate* and the *citrate* (the latter appearing as a brown hygroscopic substance, soluble in alcohol, glycerin, and the acids, and in hot water in the proportion of 1 to 2 parts), are also sometimes employed as substitutes for quinine.

From *Quinia cuprea* an alkaloidal phenol has recently been extracted, *cupreine* ($C_{19}H_{21}Az_2O,OH$). Two derivatives of this body are termed *quinethyline* ($C_{13}H_{21}AzO,OC_2H_7$) and *quino-propyline* or *propyloeupreine* ($C_{19}H_{21}Az_2O,OC_3H_7$). All these new agents possess antithermic and analgesic properties, but have not yet been largely used in practical medicine.

ployed especially as a nervine and an antispasmodic in those affections in which such drugs are indicated. It is used by the laity against dysentery, as a substitute for ipecacuanha. This plant is said to possess emetic properties.

Administration.—An *ethereal tincture* has been used, in doses of from 15 to 60 minims (0.80 to 3.20 grammes) well diluted in water.

RESORBIN.

This new body is an ointment base prepared from pure almond oil and wax by emulsion with water and some adhesive solution. It is miscible with animal, mineral, and vegetable fats.

Therapeutic Applications.—Resorbin is said to be easily absorbed by the skin, and to be of service, locally applied, in cutaneous disorders. It is, however, chiefly employed as an ointment base for a variety of medicaments. Mercury, for example, can readily be incorporated with resorbin. The following mixtures with this new substance are recommended for medicinal use: 2 to 10 per cent. of salicylic acid; 4 per cent. of boric acid; 10 per cent. each of sulphur, subnitrate of bismuth, naphthol, and pyrogallic acid; 5 per cent. each of white precipitate, resorcin, and europhen; 30 per cent. of the oxide of zinc; 5 to 10 per cent. each of aluminium-acetate solution and oil of birch; and 1 per cent. of nitrate of silver with 10 per cent. of balsam of Peru.

RESORCIN.

This drug, also commonly called *resorcinol*, is a dihydric phenol, or *metadioxybenzene*, with a formula of $C_6H_4(OH)_2$.

Physical Properties.—This drug is a white flocculent powder made up of colorless or slightly yellowish tabular crystals having a faintly urinous odor and a sweetish, pungent taste. When pure, it has a melting-point of 230° F. (118° C.) and boils at 528.8° F. (276° C.).

Solubility.—This drug is readily soluble in 1½ parts of water, in alcohol, and in ether; difficultly soluble in chloroform, benzene, or carbon disulphide.

Physiological Action.—Little is known of the physiological action of resorcin; locally, it is an irritant. It appears to act upon the central nervous system, causing, in sufficiently large amounts, tremors and even epileptiform and tetanic convulsions accompanied with loss of consciousness. The respiration and the action of the heart are disturbed, and during the convulsive action the drug produces a rise of the bodily temperature followed by a marked fall below the normal. Resorcin acts directly upon the heart, and slows the pulse apparently by pneumogastric stimulation. In general action this agent resembles carbolic acid, and, like this medicament, it destroys lower forms of organisms. Resorcin arrests putrefaction.

Therapeutic Applications.—Resorcin is reputed to possess antiseptic and antipyretic virtues. As an antiseptic it has been used in diseases of the stomach, dysentery, cholera infantum, etc. As an antipyretic it has been used in febrile affections generally, such as typhoid fever, malaria, measles, etc., and especially in the hyperpyrexia of septicæmia and in those febrile disorders attended with gastro-intestinal derangements. It has also been employed as a local remedy, with asserted success, in diseases of the upper air-passages, especially in ulcerative laryngeal phthisis, laryngeal ulcers, and other similar maladies; in gonorrhœa, diphtheria, croup, and whooping-cough; in cutaneous affections, particularly eczema, psoriasis, etc. This drug is favorably spoken of as an antispasmodic against asthma. It has likewise rendered good service in the local treatment of diseases of the ear and nose.

Administration.—The dose of resorcin is from 1 to 2 grains (0.06 to 0.12 gramme). For local use, solutions of the strength of from 1 to 3 per cent. may be used, or ointments of the strength of 5, 10, or as high as 25 per cent.

Toxicology.—Though some of the toxic symptoms caused by this drug have already been mentioned, it must be remembered that deafness, giddiness, cardiac and respiratory disturbances, clonic and tetanic convulsions, salivation, complete loss of consciousness, profuse sweating, and cyanosis—in fact, all the symptoms of approaching collapse—are apt to occur under the full action of resorcin.[1]

RETINOL.

This body, known likewise as *resinol* and *rosinol*, is a distillation-product of the pine resin, and has the formula $C_{35}H_{16}$.

Physical Properties.—This drug appears as a thick, yellowish, oily liquid having a melting-point of 460.4° F. (238° C.) and a sp. gr. of 0.900.

Therapeutic Applications.—Retinol is a good antiseptic, but its chief uses at present are those of a solvent for substances such as aristol, camphor, cocaine, creosote, iodol, phenic acid, phosphorus, and salol, and many other similar drugs and alkaloidal bodies. It has recently been employed in the local treatment of pruritus, and in that of vaginitis and various ulcers.

Administration.—The dose of retinol is 1 grain (0.06 gramme), and it is best administered in capsules. Locally, it can be applied by itself or in the form of an ointment.[2]

RHUS.

Poison-sumach, *poison-oak*, and *poison-ivy* are common appellations by which *Rhus toxicodendron* is known.

Therapeutic Applications.—Locally, *rhus* is of value

[1] *Resopyrin* is a combination of resorcin and antipyrin the therapeutic properties of which are now being studied. Other derivatives and allied compounds of resorcin will be described under their respective names.

[2] A solution of phosphorus in retinol is best made as follows: Retinol is heated to dryness at a temperature of 212° F. 100° C.; it is then placed in a dry vial and allowed to cool, when 1 per cent. of the transparent dry phosphorus is put into the liquid. A gentle heat and shaking are sufficient to produce a perfect solution.

in the treatment of inflammatory diseases of the mouth and throat. It is considered an excellent remedy in quinsy, as well as in mercurial stomatitis. As a gargle it is recommended in acute pharyngitis. Recently, this plant has been employed with success against chronic rheumatism, rheumatic gout, and certain forms of neuralgia, as, for instance, that following an attack of typhoid fever. This drug has also been recommended in the treatment of elephantiasis and in that of scaly skin diseases. It is said to be of great value also as a brain- and nerve-stimulant.

Administration.—The preparation commonly employed at present is the *tincture*, the dose of which is put down as ½ minim (0.03 gramme) three times a day. For local use lozenges each containing three grains of the extract are given. As a gargle the *fluid extract* may be used in the proportion of ½ drachm to the ounce (1.90 in 30.00 grammes).

RUBIDIUM-AMMONIUM BROMIDE.

This double salt is represented by the formula $RbBr\text{-}3NH_4Br$.

Physical Properties.—This drug occurs as a yellowish or whitish crystalline powder with a saline taste.

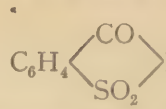
Solubility.—This drug is readily soluble in water.

Therapeutic Applications.—The *bromide of rubidium-ammonium* has been used as a sedative and hypnotic. It is claimed to be of service in the treatment of epilepsy, as a substitute for the potassium salt.

Administration.—The daily dose of *rubidium-ammonium bromide* may be said to be from 60 to 90 grains (4 to 6 grammes), and it may best be given in syrup of lemon.

SACCHARIN.

Saccharin, also termed *benzoyl-sulphonic imide*, *gluside*, and *glucusimide*, is a derivative of the aromatic series, and is represented by the formula



Physical Properties.—This substance occurs as a white powder having an intensely sweet taste and an odor slightly resembling that of almonds.

Solubility.—This drug is soluble in alcohol in the proportion of 1 to 30 parts, in glycerin, in dilute ammonia, and in solution of bicarbonate of sodium.

Therapeutic Applications.—*Saccharin* is employed as a sweetening agent for the food of diabetic patients, and as a corrective. It is likewise a good antiseptic, and is said to have produced marked benefit in the treatment of cystitis.

Administration.—The dose of saccharin is indefinite. For external application—as a mouth-wash, for example—the following combination may be used: To 10 grains (0.65 gramme) each of saccharin and bicarbonate of sodium, dissolved in 10 fluidrachms (37.25 grammes), are added 10 or 20 grains (0.65 or 1.30 gramme) of salicylic acid, and then enough spirit to make 1 ounce (30.00 grammes).

SALACETOL.

Salacetol, or *salicylacetol*, as it is also termed, is obtained from the interaction of sodium salicylate and monochloracetone. A transformation is produced, and the resulting substance is then represented by the formula $CH_3.COCH.O_2C.C_6H_4OH + NaCl$.

Physical Properties.—Salicylacetol appears in long crystalline needles that melt at 159.8° F. (71° C.). This drug saponifies readily with soda-solution or ammonia.

Solubility.—Salacetol is easily soluble in warm alcohol, in ether, chloroform, benzene, and bisulphide of carbon; less soluble in cold alcohol; sparingly soluble in hot water; it is insoluble in cold water.

Physiological Action.—Clinical observations have shown that salicylacetol diminishes the amount of the

sulphates eliminated by the urine, the drug being thus capable of acting in some way as an antiseptic.

Therapeutic Applications.—Salacetol has been employed with good results as an intestinal antiseptic in diarrhœa and similar disorders. This drug is particularly adapted for use in children, since it has been found to be much less poisonous than salol; in fact, unlike the latter remedy, salicylacetol contains no phenol. This new agent has given satisfactory results also in the treatment of subacute and chronic rheumatism.

Administration.—Salacetol may be administered alone or in combination with castor oil, in single doses of from 30 to 45 grains (2 to 3 grammes). For children daily amounts of as high as 7½ grains (0.50 gramme) may be employed.

SALICYLAMID.

This amidogen compound, a derivative of salicylic acid, is chiefly obtained by the action of concentrated ammonia upon methyl salicylate or by the action of heat upon the salicylate of ammonium. *Salicylamid* has the formula

Physical Properties.—This drug, when pure, appears in the form of colorless, tasteless, transparent plates having a melting-point of 287.6° F. (142° C.).

Solubility.—This remedy is soluble in alcohol, chloroform, and ether, and in water in the proportion of 1 to 250 parts.

Therapeutic Applications.—*Salicylamid* is used for the same purposes as salicylic acid, and is said to be a safer and a more prompt and powerful analgesic than the latter medicament. It has thus been employed, with asserted good results, in the treatment of neuralgia and ovarian pains, and also in chronic rheumatism and

follicular tonsillitis. This drug is likewise alleged to possess decided germicidal powers.

Administration.—The quantity of salicylamid to be administered daily may be put down as 15 grains (1 gramme), given in single doses of from 3 to 5 grains (0.18 to 0.32 gramme).

SALIPYRIN.

The name *salipyrin* is given to a true salt (*salicylate of antipyrin*) obtained from the interaction of antipyrin and salicylic acid. It contains 57.7 per cent. of the first and 42.3 per cent. of the second agent. This new combination is represented by the formula $C_{18}H_{18}N_2O_4$.

Physical Properties.—This salt appears as a white, odorless, crystalline substance having a more or less agreeable taste. When crystallized from alcoholic solutions it has a melting-point of 196.7° F. (91.5° C.).

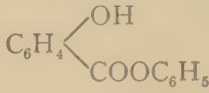
Solubility.—Salipyrin is freely soluble in alcohol and benzenes, sparingly soluble in ether, and soluble in about 200 parts of water.

Therapeutic Applications.—This remedy is claimed to be a good antipyretic and resolvent. It has been used with success against sciatica and in acute and chronic rheumatism. It is also said to have given satisfactory results in the treatment of influenza and in those forms of dysmenorrhœa which accompany the change of life.

Administration.—This drug may be given in the form of powder, in cachets, or in capsules. The single dose of salipyrin is 15 grains (1 gramme), and it may be repeated until 90 grains (6 grammes) are taken.

SALOL.

Salol is phenic ether of salicylic acid, or *salicylate of phenyl*. It is represented by the formula



Physical Properties.—This drug is a white, crystalline, tasteless powder having a slight aromatic odor; it has a melting-point of from 107.6° to 109.4° F. (42° to 43° C.).

Solubility.—Salol is soluble in alcohol, ether, turpentine, sandalwood oil, copaiba balsam, and the fixed oils; it is insoluble in water.

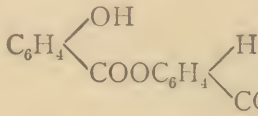
Therapeutic Applications.—Salol has decided antiseptic, antipyretic, and antirheumatic properties. It has largely been used as a substitute for the salicylates in the treatment of rheumatism. This drug is said to be of value in diseases of the urethra and bladder, such as gonorrhœa, cystitis, etc., and also in inflammatory affections of the pharynx and respiratory tract, such as colds in general, bronchitis, and catarrhal fever. This remedy has been found serviceable against diarrhœa and other intestinal disorders of children. Salol has also rendered good service, locally applied, in the treatment of acute coryza and of skin diseases, especially in eczema, impetigo, and sycosis. This medicament has been tried, with alleged good effect, in Asiatic cholera, yellow fever, and even in leprosy. Recently the drug has been employed with apparently excellent effect, subcutaneously injected, in the treatment of tubercular phthisis. Under its influence, it is claimed, the fever and night-sweats subside, and the cough, as well as the number of bacilli in the sputa, is considerably diminished, there occurring at the same time a general improvement and an increase in the bodily weight.

Administration.—The dose of salol (best given in cachets or suspended in milk) is from 5 to 30 grains (0.3 to 2 grammes), or even as high as 2 drachms (7.8 grammes) a day. Externally, this remedy may be employed as a dusting-powder (salol and chalk or starch, equal parts or 1 to 3), in the form of gauze, ointment, collodion (4 to 4 of ether and 30 of collodion), or in alcoholic solution of the strength of from 5 to 10 per cent.[1]

[1] *Saloleamphor* is a mixture of salol and camphor in the proportion of 3

SALOPHEN.

Salophen, a derivative of salol, is said to be a *salicylate of amidophenol;* it may be considered as salol in which an atom of hydrogen in the phenyl is replaced by the monivalent group. Salophen contains 50.9 per cent. of salicylic acid, its formula being



Physical Properties.—This drug, which occurs in small white lamellar crystals, without odor or taste, has a melting-point of from 368.6° to 370.4° F. (187° to 188° C.).

Solubility.—This remedy is freely soluble in alcohol, alkali, and ether. Ferric chloride produces a violet color in the alcoholic solution.

Therapeutic Applications.—Salophen is employed as an excellent substitute for salol in all those affections for which the latter medicament is used. This derivative is said to be of special value in the treatment of acute rheumatic arthritis. It has been employed with advantage also in habitual cephalalgia, in supraorbital neuralgia, and in migraine.

Administration.—Salophen is given in daily doses of from 1 to 1½ drachms (3.4 to 5.85 grammes).

to 2 parts. It occurs as a colorless, oily liquid, readily soluble in chloroform, ether, and the oils, but insoluble in water. This preparation has been highly recommended as a local application in the treatment of purulent inflammations of the middle ear. *Alphol*, which is an isomer of betol, is the *salicylic ether of alpha-naphthol*. The therapeutic action of alphol is said to be similar to that of salol. Pancreatic and the intestinal juices decompose alphol into salicylic acid and alpha-naphthol. The new remedy is recommended as antiseptic, antineuralgic, and antirheumatic. It has rendered good service in the treatment of gonorrhœic cystitis. The dose varies from 8 to 15 grains (0.5 to 1 gramme), and even as high as 30 grains (2 grammes).

SANGUINARINE.

An alkaloid extracted from the root of the common blood-root plant (*Sanguinaria canadensis*). The salt of this alkaloid recently tried in practical medicine is the *nitrate*, the composition of which is given as $C_{17}H_{15}NO_4HNO_3$.

Therapeutic Applications.—*Nitrate of sanguinarine* has been used as a general tonic and stimulant, as an expectorant, and also as a purgative and emetic. The emetic effects are produced only by comparatively large doses.

Administration.—The dose of *sanguinarine nitrate* varies from $\frac{1}{12}$ to $\frac{1}{8}$ of a grain (0.0054 to 0.0081 gramme). As an emeto-cathartic it may be given in quantities of from $\frac{1}{2}$ to 1 grain (0.032 to 0.064 gramme).

SANTONIN-OXIM.

A derivative of santonin. It is obtained by the action of an alcoholic solution of hydrochlorate of hydroxylamine on santonin, and the addition of soda. Its formula is given as $C_{15}H_{18}O_2,NOH$.

Physical Properties.—This new body appears in the form of a white crystalline powder having a melting-point of 323.6° F. (162° C.).

Solubility.—This drug is soluble in alcohol and in ether, and difficultly soluble in water.

Therapeutic Applications.—*Santonin-oxim* has been chiefly employed as a substitute for the mother-substance, to which it is claimed to be superior as an anthelmintic, owing to its lack of poisonous properties.

Administration.—The dose of santonin-oxim varies from 1 to 5 grains (0.06 to 0.30 gramme), as follows: for a child two to six years of age, 1 to 1½ grains (0.06 to 0.09 gramme); six to nine years, 2 grains (0.12 gramme); for adults, 5 grains (0.30 gramme). The dose is to be divided into two parts and given at intervals of from one to two hours, to be followed by a cathartic.

SCILLAIN.

A glucosidal principle extracted from species of the squill plant, chiefly *Urginea scilla.*

Physical Properties.—*Scillain* is a yellowish or colorless powder. With hydrochloric acid it forms a red solution.

Therapeutic Applications.—This drug possesses, like the glucosides of digitalis, diuretic properties; hence it has been used in a variety of disorders requiring activity of the renal organs.

Administration.—The single dose of *scillain* is $\frac{1}{60}$ of a grain (0.001 gramme). It may be given in amounts of from $\frac{1}{6}$ to $\frac{3}{4}$ of a grain (0.01 to 0.048 gramme) a day.

SCILLIPICRIN.

Another principle obtained from *Urginea scilla.*

Physical Properties.—This drug occurs as a yellowish-white, amorphous, and quite hygroscopic powder.

Solubility.—*Scillipicrin* is readily soluble in water.

Therapeutic Applications.—This remedy, like scillain, is used as a diuretic in those cases in which the latter substance would be indicated.

Administration.—The single dose of scillipicrin is $\frac{1}{60}$ of a grain (0.001 gramme).

SCLEROTIC ACID.

This body is extracted from *Clavieeps purpurea*, and has a chemical composition of $C_{12}H_{19}NO_9$.

Physical Properties.—This acid appears in the form of a hygroscopic, odorless, and tasteless powder.

Solubility.—This drug is freely soluble in water, and sparingly so in alcohol.

Therapeutic Applications.—*Sclerotic acid* has been highly recommended in the treatment of epilepsy. Hypodermatically, it is said to act well as a substitute for ergot.

Administration.—The dose of sclerotic acid is $\frac{1}{2}$ grain

(0.03 gramme), or 5 grains (0.30 gramme) in the course of the day.

SCOPARINE.

This principle is extracted from the common broom-plant, *Cytisus scoparius*.

Therapeutic Applications.—The chief properties of *scoparine* are those of a diuretic, and as such it has been tried with apparent success.

Administration.—The dose of scoparine is from 8 to 15 grains (0.5 to 1 gramme); hypodermatically, $\frac{1}{2}$ to 1 grain (0.03 to 0.06 gramme).

SCOPOLAMINE.

This alkaloid is obtained from *Scopolia atropoides*. The *hydrochloride* or *hydrochlorate of scopolamine* is the salt generally used in practical medicine.

Physiological Action.—In small doses scopolamine has no action on the nervous system. Unlike atropine, in therapeutic amounts it has a depressant effect upon the circulation, diminishing the pulse-rate. Large quantities, however, cause a rise of the arterial pressure by a vaso-motor stimulation centrally. As an antiphlogistic it resembles hyoscine. The secretion of saliva and of sweat is diminished by scopolamine. This drug also paralyzes accommodation and dilates the pupil. Scopolamine has apparently no action on the respiratory function. It is rapidly eliminated by the kidneys.

Therapeutic Applications.—The medicament under consideration is mainly used as a substitute for atropine. Scopolamine, unlike atropine, does not excite the cerebrum, this being considered an advantage. In fact, scopolamine is said to decrease the excitability of the brain.

Administration.—Scopolamine hydrochloride may be given in doses of from $\frac{1}{240}$ to $\frac{1}{60}$ of a grain (0.00025 to 0.001 gramme).

Contraindications.—Disturbed nutrition and renal

diseases of old age are contraindications to the use of scopolamine.

SCOPOLEINE.

Scopoleine is an alkaloidal principle obtained from the root of *Scopolia japonica.*

Physical Properties.—This substance appears as a crystalline body.

Solubility.—This drug is freely soluble in alcohol, chloroform, and ether; slightly soluble in water.

Therapeutic Applications.—No extensive application of this remedy has as yet been made in practical medicine, but it is asserted to stand in its action midway between atropine and hyoscyamine.

SODIUM.

The salts of this drug newly prepared and introduced into practical therapeutics are legion in number, but only the most important of them will be described in the following paragraphs.

SODIUM AURO-CHLORIDE.

This substance is said to contain 30 per cent. of gold.

Physical Properties.—*Auro-chloride of sodium* occurs as a golden-yellow powder which attracts moisture to a certain extent.

Solubility.—This salt is freely soluble in water, sparingly soluble in alcohol.

Therapeutic Applications.—*Sodium auro-chloride* has mainly been employed in the treatment of syphilitic disorders.

Administration.—This salt is best given in solution or in the form of lozenges. The dose is from $\frac{1}{6}$ to 1 grain (0.01 to 0.06 gramme).

SODIUM BORATE.

Therapeutic Applications.—*Borate of sodium* has been found useful in the treatment of epilepsy. This salt

has also rendered great service in paralysis agitans when the iodides, electricity, the actual cautery, suspension, and other forms of treatment have been of no avail.

Administration.—*Sodium borate* may be given in the form of powder, in doses of from 4 to 8 grains (0.25 to 0.50 gramme) three times a day.

SODIUM DI-IODO-SALICYLATE.

The formula of this salt is $HO,C_6H_2I_2CO_2Na$.

Physical Properties.—This compound occurs in white needle-like bodies.

Therapeutic Applications.—*Di-iodo-salicylate of sodium* is used as an antiseptic, particularly in the treatment of parasitic diseases of the skin, but so far its employment seems to have been limited.

Administration.—This salt is applied locally as a dusting-powder.

SODIUM DI-THIO-SALICYLATE.

Physical Properties.—This salt appears as a grayish-white, very hygroscopic powder.

Solubility.—This drug is soluble in water in the proportion of 1 to 1.

Therapeutic Applications.—*Di-thio-salicylate of sodium* has been found beneficial as an antiseptic and bactericide. It seems to have rendered good service in the treatment of gonorrhœal rheumatism and rheumatic fever. Locally, it has been successfully employed against ozæna.

Administration.—The dose of this remedy is 3 grains (0.20 gramme) twice a day.

SODIUM ETHYLATE.

This salt is represented by the formula C_2H_5,NaO.

Physical Properties.—*Ethylate of sodium* occurs in the form of a brownish or whitish powder.

Solubility.—This salt is soluble in alcohol.

Therapeutic Applications.—This medicament at pres-

ent is used only locally as an escharotic and dermal agent. It has of late rendered marked service in the local treatment of psoriasis, Paget's disease, erythematous lupus, and indolent ulcers of various origin. It has done good also in the treatment of nævi.

Administration.—As an escharotic it can be applied by means of a glass rod from a solution of 1 part to 3 parts of alcohol. As a dermal agent it can be used in the form of an olive-oil ointment of the strength of 2 per cent., or in alcoholic solution of the strength of 10 per cent.

SODIUM FORMATE.

This compound has the formula $NaCHO_2,H_2O$.

Physical Properties.—This salt occurs as a white crystalline, deliquescent powder.

Solubility.—This drug is soluble in water and in glycerin.

Therapeutic Applications.—*Formate of sodium* has been employed with apparent success in the treatment of tubercular affections.

Administration.—The dose of this remedy is $\frac{2}{5}$ to $1\frac{1}{5}$ grains (0.025 to 0.077 gramme).

SODIUM PARACRESOTATE.

This compound is represented by the formula $C_8H_7NaO_3$.

Physical Properties.—This salt appears in the form of a fine white crystalline powder having a bitter taste.

Solubility.—This medicament is soluble in about 24 parts of warm water.

Therapeutic Applications.—*Paracresotate of sodium* possesses antiseptic and antipyretic powers. This drug has been used successfully in the treatment of rheumatism and allied affections. It has given satisfactory results also in catarrhal pneumonia, typhoid fever, and gastro-intestinal disorders in general, being well tolerated

by the digestive organs. This medicament is said to be particularly useful in diseases of children.

Administration.—The dose of *sodium paracresotate* is 1 to 20 grains (0.06 to 1.3 grammes); as an antiseptic it is administered in amounts varying from $\frac{1}{8}$ to $\frac{1}{4}$ of a grain (0.0081 to 0.0162 gramme).

SODIUM SOZOIODOLATE.

This salt, called also *sodium di-iodo-phenol-mono-sulphonate*, has the composition $C_6H_2I_2(OH)SO_3Na$.

Physical Properties.—This compound appears in the form of colorless, well-defined prisms.

Therapeutic Applications.—*Sozoiodolate of sodium* has yielded good results as an antisyphilitic in the treatment of ulcers, and it is considered superior in this respect to iodoform. It is also serviceable in diseases of the bladder and in catarrhal affections of the nasal mucous membrane. The powder, simply insufflated into the nostrils, has been found highly successful in the treatment of whooping-cough.

Administration.—*Sodium sozoiodolate* is employed as a dusting-powder, as an ointment made of 10 parts each of lanolin and paraffin to 2 parts of the sozoiodolate, or in solutions of the strength of 1 per cent.

SODIUM TELLURATE.

The "normal salt" so called is *tellurate of sodium*, a body composed of $Na_2TeO_4,5H_2O$.

Physical Properties.—This compound is a white powder.

Solubility.—This salt is soluble in water.

Therapeutic Applications.—*Tellurate of sodium* is valuable in the treatment of the night-sweats of pulmonary phthisis.

Administration.—This remedy is best given in alcoholic mixtures, in single doses of from $\frac{2}{7}$ to $\frac{4}{5}$ of a grain (0.02 to 0.05 gramme), or in daily amounts of 1 grain (0.06 gramme).

SODIUM TETRABORATE.

The neutral *tetraborate of sodium* is a body containing 50 per cent. of boric acid and 50 per cent. of sodium biborate.

Physical Properties.—This compound occurs in transparent, hard, clustered crystals, neutral in reaction.

Solubility.—This salt is soluble in water at 59° F. (15° C.) to the extent of about 16 per cent.; at 100.4° F. (38° C.) to that of 20 per cent.; and at 212° F. (100° C.) to that of almost 30 per cent.

Therapeutic Applications.—*Tetraborate of sodium* is advantageous as an antiseptic agent, being considered superior to solutions of boric acid.

Administration.—This remedy is applied locally in solutions of the strength of 16 per cent.

SODIUM THIOPHENSULPHONATE.

This salt, which is a derivative of thiophen, contains 33 per cent. of sulphur, and is represented by the formula $C_4H_3S-NaSO_3$.

Physical Properties.—This compound appears as a white crystalline powder.

Therapeutic Applications.—*Thiophensulphonate of sodium* has been employed successfully in skin diseases, particularly in prurigo, in which it has been found to be superior to beta-naphthol. The sodium salt may be used in cases in which the latter remedy fails to do any good.

Administration.—This medicament may be applied as a dusting-powder.[1]

[1] Among the other new salts of sodium may be mentioned *chloroborate*, a white crystalline powder, soluble in water; *gynocardate*, a yellowish-white substance, soluble in water, and partly in alcohol; *silico-fluoride* (NaF_2SiF_4), a white crystalline powder, soluble in water in about .50 per cent.; and *sulphoricinate*, a brown liquid, of syrupy consistency, freely soluble in alcohol and in water. All of these compounds have been recommended as antiseptics. To the *sodium caffeine-sulphonate* the common name of *nasrol* has been given. It is said to be an excellent diuretic, superior to digitalis and other similar remedies. Nasrol can be given in daily doses of 1 drachm

SOLANIN.

A glucosidal principle extracted from several plants belonging to the *Solanaceæ*, principally from *Solanum nigrum*, *S. vervascifolium*, and others. This drug has a chemical composition of $C_{43}H_{71}NO_{16}$.

Physical Properties.—*Solanin* is a powder made up of acicular crystals having a melting-point of 455° F. (235° C.).

Solubility.—This glucoside is soluble in hot alcohol, somewhat soluble in ether, and with great difficulty in water.

Therapeutic Applications.—Solanin, which possesses analgesic properties, has been employed as a substitute for morphine in the treatment of neuralgia. It has also produced satisfactory results in asthma, bronchitis, and the vomiting of pregnancy.

Administration.—This remedy is best administered in powder or in pill form, in doses of from $\frac{1}{6}$ to 1 grain (0.01 to 0.06 gramme). For hypodermatic injections the *hydrochloride* has been used in similar amounts.

SOLUTOL.

This name is given to a combination of cresylic acid (cresol) and sodium cresylate. It contains in every $3\frac{3}{8}$ fluidounces (100 grammes) 2 ounces (60.4 grammes) of cresylic acid, of which one-fourth is in the free state and the other three-fourths combined as sodium cresylate.

Therapeutic Applications.—*Solutol* is mainly used as an antiputrefactive and disinfectant. It has been found of service in the disinfection of sputa, bed-clothing, excrements, water-closets, etc.

(4 grammes), and is best administered in capsules. There occurs upon the market also, under the name of *antirheumatin*, a combination of sodium salicylate and methlene blue. The compound appears in the form of dark-blue prisms having a somewhat acrid, faintly bitter taste resembling that of salicylic acid. It is soluble in water and in alcohol. Antirheumatin has been employed with alleged good results against rheumatism, in doses of from 1 to 1½ grains (0.06 to 0.10 gramme), and is best given in pill form. The drug produces a blue or greenish discoloration of the urine.

Administration.—Solutions of the strength of 0.5 per cent. are claimed to kill within five minutes all the bouillon cultures tested.

SOLVEOL.

This substance is a neutral concentrated solution of cresylic acid.

Therapeutic Applications.—This compound is employed, like the preceding, as an antiseptic, being, it is said, superior to carbolic acid. Solutions of *solveol* of the strength of 0.5 per cent. are but slightly irritant.

Administration.—This drug is applied locally in the strength indicated.

SOMNAL.

An ethylated compound of chloral and urethane, being represented by the formula $C_7H_{12}Cl_3O_3N$.

Physical Properties.—This medicament occurs as a clear, colorless liquid having a hot, burning taste resembling that of sweet spirit of nitre.

Therapeutic Applications.—*Somnal* has chiefly been employed, with alleged successful results, as a hypnotic.

Administration.—This remedy is best given in licorice-water or in raspberry syrup, in doses of from 15 to 30 minims (1 to 2 grammes).

SOZOIODOL.

This term is applied to *diiodparaphenolsulphonic acid*, obtained by the interaction of potassium paraphenolsulphonate dissolved in dilute hydrochloric acid and a solution of iodide and iodate of potassium. The formula of this substance, which contains 52.8 per cent. of iodine and 7 per cent. of sulphur, is $C_6H_2I_2OHSO_3H$.

Physical Properties.—This drug occurs in acicular prisms.

Solubility.—*Sozoiodol* is readily soluble in alcohol, water, and glycerin.

Therapeutic Applications.—This medicament has

been employed as a general antiseptic in diseases of the skin, pharynx, and nose. It is said to be of value in venereal disorders, in affections of the stomach, and in rheumatism. This drug has also been used extensively in gynecology and surgery as a substitute for iodoform.

Administration.—Sozoiodol is applied as a dusting-powder, in the form of gauze, as a collodion, and in solution of the strength of from 5 to 20 per cent.

SPARTEINE.

An alkaloidal principle obtained from the broom-plant, *Cytisus scoparius* or *Sarothamnus scoparius*. The chemical composition of the alkaloid is $C_{15}H_{26}N_2$.

Physical Properties.—This drug appears as an oily, volatile, unstable liquid with a bitter taste and an odor resembling that of pyridin. It has a melting-point of 550.4° F. (288° C.). The *sulphate*, the chief salt used in practical medicine, occurs as a transparent, colorless, crystalline powder.

Solubility.—This salt is freely soluble in alcohol, and in water in the proportion of 2 to 3 parts.

Physiological Action.—In sufficiently large amounts sparteine acts as a depressant both to the cerebral and spinal centres. It produces loss of motor power, decreases the reflexes, and finally causes paralysis. In moderate doses sparteine acts upon the circulation as a stimulant, increasing both the arterial pressure and the rapidity of the pulse. It also increases cardiac force. Large quantities depress the circulation, producing finally a systolic arrest of the heart. In toxic doses sparteine is a respiratory depressant.

Therapeutic Applications.—This remedy is alleged to be of service as a cardiac tonic both in valvular affections and in functional disorders of the heart, its action resembling that of digitalis. It has been used as a diuretic in cardiac disease, as a substitute for the latter medicament. It is said to be superior to digitalis in nervous palpitation, and to be of distinct value in such

disorders as hysteria and neurasthenia. This drug is claimed to be of special service in the treatment of exophthalmic goitre, by controlling the general symptoms and reducing the pulse-rate.

Administration.—Sulphate of sparteine may be given in single doses of from $\frac{1}{2}$ grain to 2 grains (0.03 to 0.12 gramme).

Toxicology.—This drug may cause general nervous depression, and among the early toxic effects produced may be mentioned tremors, inco-ordination of movements, and even clonic and tetanic convulsions.

SPASMOTIN.

Under the name of *spasmotin* or that of *sphacelotoxin* a new poisonous body has of late been extracted from ergot. Chemical analysis gives it the formula $C_{20}H_{21}O_9$.

Physical Properties.—In the pure state spasmotin occurs in the form of an amorphous yellow power.

Solubility.—This substance is soluble in alcohol, sulphuric and acetic ethers, and benzene. It is insoluble in water, dilute acids, and petroleum ether. The drug forms salts with alkalies.

Physiological Action.—The name of spasmotin has been applied owing to the fact that the drug is able to contract the small arteries. It is affirmed that the well-known action of ergot on the pregnant uterus resides principally in spasmotin and its sodium salt.

Therapeutic Applications. — Though not yet employed in practical medicine, spasmotin is suggested as a substitute for ergot. In experiments upon the lower animals doses of from $\frac{2}{3}$ of a grain to 15 grains (0.04 to 1 gramme) gave satisfactory results.

SPERMIN.

A substance extracted from the seminal fluid of various animals, the chemical composition of which is said to be C_2H_5N.

Physical Properties.—*Spermin* occurs as a crystalline body.

Therapeutic Applications.—Spermin has been highly lauded in the treatment of nervous disorders, chiefly cerebral depression and general and senile debility. It is asserted to have produced good results also in diabetes mellitus, in collapse, and even in pulmonary tuberculosis.

Administration.—This substance is best administered subcutaneously.

STRONTIUM BROMIDE.

This salt is represented by the formula $SrBr_2,6Aq$.

Physical Properties.—This salt is composed of long colorless needles.

Solubility.—*Bromide of strontium* is freely soluble in water.

Therapeutic Applications.—*Strontium bromide* has been used with apparent success in superacid diseases of the stomach and in the treatment of epilepsy. This salt has also been found beneficial against rheumatic gout.

Administration.—The daily dose of this remedy is from 30 to 60 grains (2 to 4 grammes). As high as 6½ drachms (25.20 grammes) may be given in a case of epilepsy.

STRONTIUM LACTATE.

Lactate of strontium has the composition $Sr(C_3H_5O_3)_2,3Aq$.

Physical Properties.—This compound appears as a white granular powder.

Solubility.—This salt is soluble in water.

Therapeutic Applications.—*Strontium lactate* has been recommended especially in chronic diseases of the kidneys, in which the albumen of the urine is said to be notably diminished, and even suppressed, under the influence of this medicament.

Administration.—The daily dose of this salt may be put down as from 2 to 2½ drachms (8 to 10 grammes).[1]

STROPHANTHIN.

A glucosidal principle extracted from the seeds of several species of the strophanthus plant, chiefly *Strophanthus hispidus*. *Strophanthin* has the formula $C_{20}H_{34}O_{10}$.

Physical Properties.—This principle appears as a white amorphous or crystalline powder having an intensely bitter taste.

Solubility.—This drug is readily soluble in water and in alcohol.

Therapeutic Applications.—This remedy has been used largely as a heart-tonic, mainly as a substitute for digitalis, and particularly in those cases in which the latter drug fails to act. It has been used with asserted success in the treatment of pruritus.

Administration.—The daily dose of strophanthin is put down as from $\frac{1}{60}$ to $\frac{1}{30}$ of a grain (0.001 to 0.002 gramme). Hypodermatically, it may be given in doses of $\frac{1}{160}$ to $\frac{1}{100}$ of a grain (0.0003 to 0.0006 gramme).

STRYCHNINE.

The salt of this drug lately tried in practical therapeutics is the *arsenate*. It is represented by the formula $C_{21}H_{22}N_2O_2,As$.

Physical Properties.—*Arsenate of strychnine* occurs as a white crystalline powder having, like the alkaloid itself, a very bitter taste.

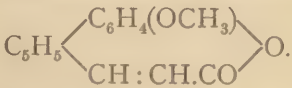
Therapeutic Applications.—This salt has mainly been employed as a tonic and diuretic. It has been tried with apparent benefit in the treatment of pulmonary phthisis.

[1] Two other salts, *phosphate* and *orthophosphate*, of strontium are at present being tried in medicine, but the results have not been sufficiently reported to draw any conclusions regarding their therapeutic value.

Administration.—*Strychnine arsenate* is best given from a $\frac{1}{2}$ per cent. solution made in liquid vaselin, the daily dose of it being from 4 to 15 minims (0.24 to 0.92 gramme).

STYRACOL.

When guaiacol and cinnamyl chloride are heated together they give rise to the formation of the so-called *styracol*, which, when pure, has the formula



Physical Properties.—This mass occurs in the form of a crystalline powder composed of needles having, if pure, a melting-point of 284° F. (140° C.).

Therapeutic Applications.—*Styracol* has been employed as an antiseptic in the treatment of tuberculosis, as a substitute for guaiacol. This medicament, internally administered, is said to be of service in diseases of the gastro-intestinal tract, and also in gonorrhœa and chronic vesical catarrh.

STYRON.

A compound of balsam of Peru and liquid storax.

Therapeutic Applications.—This drug has been used locally as an agreeable dressing and deodorizer over ulcerating surfaces. It has given relief in phthisis. The drug is said to act upon the bacillus of cholera in such a manner as to be thought of service in this malady. It has been tried with most favorable results as an antiseptic.

Administration.—Locally, *styron* is employed in solution of the strength of 8 per cent.; for introduction into pleural and peritoneal cavities, in solutions in water of the strength of 1 : 50, 1 : 100, or 1 : 200, as the case requires. For a spray it is used in the strength of 4 per cent.

SULPHAMINOL.

Sulphaminol is the name applied to *thioxydiphenylamin*, obtained by the action of sulphur on the salts of metaoxydiphenylamine.

Physical Properties.—This drug appears as a pale-yellow, odorless, and tasteless powder having a melting-point of 311° F. (155° C.). The solutions are of a pale-yellow color.

Solubility.—Sulphaminol is freely soluble in alkalies, alcohol, and acetic acid; it is insoluble in water.

Therapeutic Applications.—Thioxydiphenylamin possesses good antiseptic properties, and has been employed with favorable results as a substitute for iodoform in the treatment of wounds, ulcers, and other similar disorders. It has been especially used in rhinological practice. Internally, it has been found beneficial in cystitis.

Administration.—Sulphaminol is given in single or daily doses of 4 grains (0.24 gramme) and 15 grains (1 gramme) respectively. It is generally applied, however, as a dusting-powder.[1]

SULPHONAL.[2]

This is *diethylsulphon-dimethyl-methane*, obtained by the interaction of anhydrous mercaptan and anhydrous acetone in the presence of hydrochloric acid gas. The formula of this drug is $(CH_3)_2C(SO_2C_2H_5)_2$.

Physical Properties.—Sulphonal is a colorless, odorless substance made up of prismatic crystals melting at from 257° to 258.8° F. (125° to 126° C.).

[1] Derivatives of sulphaminol (such as *sulphaminol-creosote*, *sulphaminol-eucalyptol*, *sulphaminol-guaiacol*, and *sulphaminol-menthol*) are being tried at present in the treatment of laryngeal tuberculosis and in rhino-laryngology.

[2] Sulphonal must not be confounded with *sulphinol*. This latter drug is said to be a mixture of borax, boric acid, and alkaline sulphites, occurring as a white, crystalline, odorless powder, soluble in 10 parts of water and in 20 parts of glycerin. A solution of the strength of from 2 to 10 per cent. is said to act as a good disinfectant in the treatment of wounds.

Solubility.—This drug is soluble in alcohol and in ether; also in 100 parts of cold water and in 20 to 15 parts of boiling water.

Physiological Action.—The action of sulphonal is not well known. It is said to act as a depressant to the nervous system, decreasing reflex activity by stimulation of Setschenow's centres. In moderate amounts this drug appears to exercise no marked action on the circulation. Its influence on metabolism is *nil.* Sulphonal, given in small quantities, appears to be entirely destroyed in the body, it being changed into a sulphuretted substance. It is said to act slightly as a diuretic.

Therapeutic Applications.—The chief properties of sulphonal are those of a hypnotic. As such it has been used extensively in a variety of nervous disorders whose principal symptom is sleeplessness with or without the existence of pain. This drug is of special value in some forms of insanity, in neurasthenia, and in hysteria. This medicament has likewise been recommended in the treatment of diabetes mellitus.

Administration.—The dose of sulphonal is from 15 to 30 grains (1 to 2 grammes), and it is best administered in capsules or in mucilage of acacia.

Contraindications.—This drug should not be used in diseases of the heart.

Toxicology.—Sulphonal is capable of causing serious symptoms. Sulphonism is made manifest by cephalalgia, buzzing in the ears, weakness, and physical and mental torpor. The symptoms of chronic poisoning are constipation and vomiting accompanied with ataxic nervous troubles. Palpitations, swelling of the joints, pains in the lower extremities, and a rubeolar exanthem have been observed under the action of this drug. In some instances there may occur difficulty of speech, œdema of the eyelids, ptosis, cyanosis, and somnolence. When any one of these symptoms appears this medicament should be suspended immediately.

TANGHININE.

A principle extracted from *Tanghinia venenifera;* its chemical constitution has not yet been established definitely; it is said to be wanting in nitrogen.

Physical Properties.—This drug occurs as a crystalline body, and melts at a temperature of 359.6° F. (182° C.).

Solubility.—*Tanghinine* is soluble in alcohol and in ether, and in water in the proportion of 1 to 100 parts.

Therapeutic Applications. — Although resembling strophanthine and ouabaïne in its action, *tanghinine* has not yet been employed in practical medicine.

TEREBENE.

A mixture of several terpenes resulting from the distillation of the oil of turpentine with sulphuric acid. *Terebene* is represented by the formula $C_{10}H_{16}$.

Physical Properties.—This body appears as a yellowish liquid with an odor likened to that of thyme.

Solubility.—This liquid is readily soluble in ether, less so in alcohol, and almost insoluble in water.

Therapeutic Applications.—*Terebene* is a medicament useful as a stimulant expectorant, and as such it has been tried with good results in the treatment of chronic bronchitis and hay asthma. Locally, it is said to be beneficial in wounds.

Administration.—This remedy is best given in emulsion or in capsules, in doses of from 4 to 6 minims (0.24 to 0.36 gramme) every three or four hours. Externally, it may be applied in solution of the strength of 5 per cent.

TERPINE.

The *hydrate of terpine* is obtained by the interaction of 4 parts of the oil of turpentine, 1 part of nitric acid, and 3 parts of alcohol at 176° F. (80° C.). It is represented by the formula $C_{10}H_{16}.3H_2O$.

Physical Properties.—*Terpine* appears in the form of white rhombic crystals, without odor, and having a

slightly aromatic taste. Its melting-point is from 240.8° to 242.6° F. (116° to 117° C.).

Solubility.—Terpine is soluble in 10 parts of alcohol, in 32 parts of boiling water, in 250 parts of cold water, and to some extent in carbon disulphide, benzene, and turpentine.

Therapeutic Applications.—This remedy has antiseptic and expectorant properties. It has been employed successfully in subacute and chronic bronchitis and in whooping-cough. This drug has also been recommended as a diuretic against chronic inflammation of the kidneys.

Administration.—As an expectorant the dose of terpine is from 2 to 3 grains (0.12 to 0.18 gramme). In chronic nephritis it may be given in doses of from 5 to 6 grains (0.30 to 0.36 gramme), and in whooping-cough in doses of from 20 to 40 grains (1.3 to 2.6 grammes). It is best administered in tablets or in alcoholic and syrupy mixtures.

TERPINOL.

By boiling together terpine and water acidulated with hydrochloric or sulphuric acid, *terpinol* is obtained. It is a mixture of terpenes with a formula of $2(C_{10}H_{16}),H_2O$.

Physical Properties.—This agent occurs as a colorless oily liquid with an odor resembling that of jasmine; it has a sp. gr. of 0.852.

Solubility.—This drug is soluble in alcohol and in ether, but is insoluble in water.

Therapeutic Applications.—Like terpine, *terpinol* possesses expectorant and stimulant properties, and has been used with benefit in the treatment of bronchitis.

Administration.—This remedy is best given in capsules or in pill form, alone or in combination with the benzoate of sodium. The dose of terpinol is from 10 to 15 minims (0.60 to 0.90 gramme).[1]

[1] *Terpineol* ($C_{10}H_{17}OH$) is the name given to a colorless liquid with a bitter taste and a sp. gr. of 0.940; it is recommended as a deodorizer.

TETRA-ETHYL-AMMONIUM.

This substance, supposed to be a normal constituent of the animal body, is obtained by decomposing its iodide by moist nitrate of silver, or its sulphate by means of baryta. It has the chemical composition NEt_4OH.

Physical Properties.—*Tetra-ethyl-ammonium* occurs in deliquescent hair-like needles. It is a very bitter substance, strongly alkaline, and absorbs carbon dioxide from the air. This drug forms numerous salts with the various acids, and beautiful double-salts with metals such as gold, mercury, platinum, etc.

Physiological Action.—Locally applied to the skin, it is said to act as a caustic, and in concentrated form to burn the tongue. It has the power of saponifying fats. It is said to exercise no deleterious influence on the circulation, the respiration, or the bodily temperature.

Therapeutic Applications.—This recently-introduced remedy has been found of unusual value as a solvent for urea and uric acid, being considered superior to piperazine. It has given very satisfactory results in the treatment of acute rheumatism, and appears to be indicated in gouty and other rheumatic conditions.

Administration.—Tetra-ethyl-ammonium may be given in daily doses of from 10 to 20 minims (0.60 to 1.20 gramme) of a 10 per cent. solution. Hypodermatically, it may be administered in amounts of not more than 10 minims (0.60 gramme) of 1 per cent. solution. The latter solution can also be employed by cataphoresis, especially in cases of gouty joints or rheumatic tophi.

Toxicology.—Unlike *tetra-methyl-ammonium*, which is a poisonous substance, tetra-ethyl-ammonium appears to be a safe remedy and destitute of noxious properties.

TETRONAL.

This term is applied to *diethyl-sulphon-diethylmethane*, which is represented by the formula $(C_2H_5)_2C.(SO_2C_2H_5)_2$.

Physical Properties.—*Tetronal* appears in the form of brilliant scales which melt at 185° F. (85° C.) and

which have a bitter taste and a slight camphor-like odor.

Solubility.—This substance is soluble in about 450 parts of water, and in alcohol in the proportion of 1 to 5 parts.

Therapeutic Applications.—Tetronal is chiefly used at present as a hypnotic.

Administration.—The dose of this remedy is from 10 to 20 grains (0.6 to 1.2 grammes) twice or thrice daily. It is best given in cachets or capsules.

TEUCRIN.

Teucrin is an aqueous extract obtained from *Teucrium scordium* of the *Labiatæ*, but whose chemical nature has not been determined accurately, although it is said to contain a large amount of sulphur, especially in the form of the sulphide of calcium.

Physical Properties.—Teucrin occurs as a dark-brown fluid of a pungent taste and a "cabbage-like smell." It is acid in reaction, and has a sp. gr. of 1150.

Physiological Action.—Injected subcutaneously, teucrin produces in either healthy or sick persons a sudden rise of the bodily temperature, reaching from 38.5° C. to 40° C. in from eight to ten hours. The fever thus caused is aseptic, and the patients exhibit afterward a good appetite, but their secretions and excretions remain unchanged. Locally, this new substance produces a slight swelling about the point of injection, and sometimes œdema and pain, which in healthy individuals are apt to last for twenty-four hours.

Therapeutic Applications.—This drug apparently has been advantageously employed in the treatment of tuberculous abscesses. Its action resembles that of cantharidine and tuberculin, teucrin causing a local hyperæmia around the remains of chronic inflammatory processes, as well as an increase in the production of lymph, accompanied by constitutional symptoms, such as fever, tachycardia, etc. It is claimed that the use of this new drug

in tuberculous abscesses is followed by rapid healing. The remedy is also said to be of great service in fungous adenitis, actinomycosis, and lupus. Its use is suggested in the treatment of local tuberculosis of the soft tissues. Locally applied in the form of ointment or suppositories, teucrin is recommended in the treatment of various forms of hemorrhoids. It is said greatly to relieve the local trouble.

Administration.—Teucrin has been employed hypodermatically in doses of as high as 45 grains (3 grammes). For local applications 10 grains (0.6 gramme) may be used as an ointment with lanolin and olive oil, once daily.

THALLIN.

This compound, which is obtained by heating together para-amidoanisol and acrolein in the presence of some oxidizing agent, is the *tetra-hydropara-methyl-oxychinolin* or *tetra-hydroparachinanisol*, whose chemical constitution is represented by the formula $C_{10}H_{11}NO$.

Physical Properties.—Thallin is a liquid at ordinary temperature, but when cooled appears in the form of a yellowish-white crystalline powder having a saline, bitter taste and an odor resembling that of the coumarin bean.

Solubility.—This medicament is soluble in water in the proportion of 1 to 5 parts. The two chief salts used in medicine, the *sulphate* and the *tartrate*, are both soluble in water in the proportion of 1 to 7 and 1 to 10 parts respectively, and slightly soluble in alcohol.

Physiological Action.—In large doses thallin acts as a depressant to the circulation, lowering arterial pressure by influencing the heart and the vaso-motor system. On normal temperature the drug exercises but little if any influence. It, however, reduces febrile temperature by increasing heat-dissipation. Thallin also acts as an antiseptic, and appears to exert some influence as a diuretic, producing at the same time a dark-brown color of the urine. It is said to decrease the elimination of carbon

dioxide and urea. This drug is rapidly eliminated by the kidneys.

Therapeutic Applications.—The salts are employed in practical medicine, though not very extensively, as germicides and antipyretics especially. They have been used with apparent success in the treatment of gonorrhœa. Thallin seems to be quite active in diminishing the fever of phthisis. It is particularly recommended in the treatment of typhoid fever.

Contraindications.—The use of thallin is contraindicated in nephritic disease and in valvular affections of the heart.

Administration.—Either salt is given in doses of from 2 to 4 grains (0.12 to 0.25 gramme), and even as high as 8 grains (0.50 gramme). For injections in gonorrhœa the sulphate may be applied in 1½ per cent. solutions by itself, or in combination with tannin and nitrate of silver. Bougies smeared with a 2 per cent. ointment made with cacao butter may be employed.

Toxicology.—Nausea and vomiting, excessive sweating, cyanosis, and collapse are quite often caused by thallin. Chilliness, particularly, is a most disagreeable symptom produced by this medicament. In chronic poisoning the drug diminishes the number of red blood-corpuscles and causes destructive changes in the kidneys.

THEOBROMINE.

This alkaloidal body is extracted from the cacao-plant (*Theobroma cacao*), and has a composition of $C_7H_8N_4O_2$.

Physical Properties.—*Theobromine* occurs as a colorless crystalline powder having a bitter taste.

Solubility.—This alkaloid is soluble in alcohol and in ether, and slightly so in water.

Physiological Action.—This drug in physiological doses seems to exercise no perceptible action upon the circulatory system of mammals. The pulse and blood-pressure remain *unchanged*. Only in comparatively large amounts does theobromine cause a *reduction* of the press-

ure and of cardiac rate. This drug has marked diuretic properties, and to this action, by which the organism is freed from deleterious fluids, are due the stimulating cardiac effects following the ingestion of the remedy, and not to a direct influence. *Ethyl-theobromine* has been found to cause clonic and tonic convulsions of cerebral origin, reduction of the arterial pressure, and, in sufficiently toxic amounts, death, preceded by symptoms of paralysis of cerebral and spinal origin.

Therapeutic Applications.—Theobromine has properties similar to those of caffeine and theine, but is not generally used in medicine by itself, on account of its insolubility. There are two principal salts used: one, known as *diuretin* (*q. v.*), has been noted; the other, also a double compound, will next be described.

THEOBROMINE AND LITHIUM SALICYLATE.

This double salt, unlike its sister theobromine compound, *diuretin*, has not yet been studied thoroughly as a chemical body.

Physical Properties.—This salt occurs as a white powder.

Solubility.—This compound is soluble in about 5 parts of water.

Therapeutic Applications.—The *salicylate of theobromine and lithium* has been employed as a diuretic with alleged beneficial results, especially in the treatment of cardiac dropsies.

Administration.—The dose of *theobromine and lithium salicylate* is set down as 15 grains (1 gramme) four times a day.[1]

THERMIFUGIN.

This substance is termed *methyl-trihydro-oxyquinolin*. This drug is chemically represented thus: $C_9H_5(CH_3)N\text{-}COONa$.

[1] *Iodotheine* and *iodotheobromine*, like *iodocaffeine* (*q. v.*), have recently been recommended as diuretics and cardiac stimulants, each in daily doses of from 7½ to 45 grains (0.5 to 3 grammes), in the form of cachets.

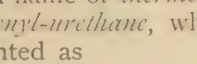
Physical Properties. — This remedy occurs as a slightly yellowish white salt.

Solubility.—It is taken up by water, giving to the solution a brownish color.

Therapeutic Applications. — *Thermifugin* has not been tried extensively in practical medicine, but is said to possess antipyretic properties. Further researches, however, are wanting before its proper uses and dose can be determined.

THERMODIN.

The common name of *thermodin* has been applied to *acetyl-ethoxyphenyl-urethane*, whose chemical composition is represented as



Physical Properties.—Thermodin occurs in the form of odorless and almost tasteless crystalline needles with a melting-point of from 186.8° to 190.4° F. (86° to 88° C.).

Solubility.—This new agent dissolves in boiling water in the proportion of 1 to 450 parts, and in cold water at 68° F. (20° C.) in the proportion of 1 to 2600 parts.

Therapeutic Applications.—Thermodin is claimed to be a good antithermic, and is said to have given satisfactory results in the treatment of such affections as influenza, pleurisy, pneumonia, diphtheria, erysipelas, typhoid fever, and tuberculosis. The effects are said to appear during the first hour after the administration of the drug, and to last about four hours. No untoward symptoms traceable to the influence of the medicament have been noticed. Thermodin is also said to possess feeble antineuralgic virtues.

Administration.—The dose of thermodin is put down as about 15 grains (1 gramme).

THILANIN.

This new dermic agent is a sulphuretted lanolin containing 3 per cent. of sulphur.

Physical Properties.—This medicament occurs as a yellowish-brown unctuous substance having the consistency of lanolin.

Therapeutic Applications.—This remedy is claimed to be advantageous in the treatment of cutaneous affections, principally in the acute and subacute forms of facial eczema, chronic and scaly eczema of the legs, papulo-vesicular eczema of the hands, and in other forms of this disease. It has also been tried, with apparent beneficial results, in sycosis vulgaris, chrysarobin dermatitis, and other disorders of the skin.

Administration.—Thilanin is locally applied.

THIOL.

A mixture of sulphuretted hydrocarbons.

Physical Properties.—This medicinal agent occurs in two forms—a liquid one, and as a fine brown powder. Liquid thiol is a thin brownish-black extract with a sp. gr. of from 1.080 to 1.082 at 59° F. (15° C.).

Solubility.—*Thiol* is soluble in water, especially in the presence of glycerin.

Therapeutic Applications.—This medicament is, like ichthyol, employed in diseases of the skin, such as acne, eczema, erythema, erysipelas, lymphangitis, sycosis, etc. It has been recommended in the treatment of joint infiltrations, subcutaneous hemorrhages, chilblain, and periphlebitis. The drug is alleged to have done good in syphilitic and scrofulous ulcers, in rheumatism, in lupus, in endometritis, and in pelvic exudations in general.

Administration.—The dose of thiol is about 1½ grains (0.09 gramme), best given in pill form or in wine and chocolate solutions of the strength of from 1 to 2 per cent. Locally, it is usually applied in powder form, or in collodion in the strength of 5 per cent. of the pow-

der; as an ointment, in the strength of 10 per cent. of the liquid; or in glycerin and aqueous solutions of the strength varying from 10 to 50 per cent. of the powder.

THIOPHEN.

A sulphur-holding hydrocarbon; a benzol product closely allied to pyrrol, and having the formula C_4H_4S.

Physical Properties.—This agent appears as a colorless, clear, volatile oil having a boiling-point of 183.2° F. (84° C.).

Solubility.—This drug is insoluble in water.

Therapeutic Applications.—*Thiophen* so far has not been used in practical medicine, but it has been employed in the form of *thiophen sodium sulphonate* (see p. 186) and *diiodide of thiophen.*

THIOPHEN DIIODIDE.

This derivative of thiophen, which contains 9.5 per cent. of sulphur, is represented by the formula $C_4H_2I_2S$.

Physical Properties.—A crystalline body appearing in the form of beautiful tablets; volatile at ordinary temperatures, the melting-point being 104.9° F. (40.5° C.).

Therapeutic Applications.—*Diiodide of thiophen* has been employed as an antiseptic in diseases such as bursitis, carcinoma, mastitis, and in a variety of surgical affections, especially those in which iodoform is indicated.

Administration.—This medicament may be applied as a dusting-powder or in the form of gauze.

THIORESORCIN.

A product of varied action in combination with resorcin, sodium hydrate, sulphur, and hydrochloric acid; a body represented by the formula $C_6H_4(OS)_2$.

Physical Properties.—This body appears in the form of a grayish flocculent powder, odorless, tasteless, and non-irritating.

Solubility.—This medicament is slightly soluble in alcohol and in ether, but insoluble in water.

Therapeutic Applications.—The chief use of *thiorcsorcin* is as an antiseptic. It is employed as a substitute for iodoform, especially in the treatment of ulcers of the leg. It is used also in skin diseases, such as eczema, psoriasis, and scabies.

Administration.—This remedy is usually applied as a dusting-powder. It may be employed also in the form of an ointment of the strength of from 50 to 100 grains to the ounce of vaseline (3.25 to 6.50 grammes in 31.1 grammes).

THIOSINAMIN.

This drug, the *allyl-sulpho-carbamide*, is obtained by heating together 2 parts each of allyl and mustard oil, 1 part of absolute alcohol, and 7 parts of spirit of ammonia, the product being afterward concentrated by a water-bath. It is a constant chemical substance.

Physical Properties. — *Thiosinamin* occurs in the form of a crystalline body.

Solubility.—This drug is readily soluble in alcohol and in ether.

Physiological Action.—While acting favorably on the digestive functions, this drug also influences the activity of the kidneys. The diuresis has been noticed particularly when exudations exist—a point in favor of the eliminative powers of thiosinamin.

Therapeutic Applications.—This remedy has been advantageously used, hypodermatically, in affections of the skin. It is said also to exercise extraordinary resolving effects upon scar-tissue and local tuberculosis, and to act as a powerful tonic on the general system. Lupus has yielded to the influence of this medicament. It is likewise asserted to have given satisfactory results in the treatment of chronic enlargement of lymphatic glands and in old corneal opacities. This drug has been employed successfully, it is claimed, in female diseases, such as uterine retroflexion, tumors of the appendages, and perimetritis with salpingitis. One of the most

notable effects observed in the former class of these cases has been the reduction of the tumors.

Administration.—Thiosinamin is administered subcutaneously from a solution of the strength of 15 per cent. The dose of this solution may be put down as from 5 to 30 minims (0.3 to 1 gramme) twice a week, its effects being watched carefully until tolerance is established.

THYMACETIN.

A derivative of thymol. It is closely allied to phenacetin, and its chemical formula is

$$C_6H_2,CH_3,C_3H_7\begin{cases}OC_2H_5\\NH(C_2H_3O).\end{cases}$$

Physical Properties.—This drug is a white crystalline powder.

Solubility.—*Thymacetin* is slightly soluble in water.

Therapeutic Applications.—This remedy is credited with analgesic and hypnotic properties. It has been employed successfully in nervous and mental disorders, such as nervous headaches not due to organic disease.

Administration.—The dose of thymacetin may be put down as from 3¾ to 15 grains (0.25 to 1 gramme). As a hypnotic it may be administered in amounts of 7½ grains (0.5 gramme).

THYMOL.

This body, also called *methyl-para-propyl-metaphenol*, is obtained from the volatile oils of thyme (*Thymus vulgaris* or *serpillum*) and other allied plants. It is chemically represented as $C_6H_3.CH_3.OH.C_3H_7$ or $C_{10}H_{14}O$.

Physical Properties.—Thymol occurs in liquid form or in acicular crystals.

Solubility.—Thymol is soluble in the fatty and essential oils, but is insoluble in water.

Physiological Action.—In sufficiently large amounts

thymol acts as a depressant to the higher functions. The drug has a peculiar odor, and has the disadvantage of attracting flies.

Therapeutic Applications.—This drug has antiseptic properties. It has been employed internally in gastric fermentation and other similar disorders. Thymol is alleged to have done good in the treatment of typhoid and typhus fevers and rheumatism. It has produced good results in the treatment of wounds, mouth affections, and toothache, and in that of skin diseases, such as tinea and pityriasis of the head. In the form of inhalations it is highly serviceable in bronchitis, pulmonary gangrene, and whooping-cough. Thymol has been tried, with alleged beneficial results, as an antipyretic, and more recently it has been lauded as an anthelmintic. The drug has been found to exercise a special action on anchylostoma, although ascarides are also acted upon by thymol.

Administration.—The usual dose varies from 1 to 2 grains (0.06 to 0.12 gramme). In the case of worms, doses of 30 grains (2 grammes) are recommended. As an antipyretic thymol may be given in amounts of from 5 to 15 grains (0.30 to 1 gramme). Locally, this drug is employed in solutions of the strength of from 1–10 : 1000, or in the form of an ointment of the strength of from 1 to 5 per cent.

Toxicology.—Thymol, given internally, has caused alarming symptoms of collapse. Among other untoward effects sometimes caused by this drug are nausea and vomiting, and even diarrhœa, ringing in the ears, deafness, and reduction of the bodily temperature. Marked delirium may supervene in some instances. The urine may assume a yellowish-brown or dark-greenish color.[1]

[1] There has recently been introduced upon the market a preparation under the name of *diphtherícide*, in the form of pastilles each one of which contains the following substances: $\frac{1}{32}$ grain (0.002 gramme) of thymol; $\frac{1}{3}$ grain (0.02 gramme) of sodium benzoate; and $\frac{1}{4}$ grain (0.015 gramme) of saccharin. The pastilles, three or four of which are to be chewed in the course of the day, are recommended in the prophylactic treatment of diphtheria.

THYROIDIN.

Physical Properties.—Thyroidin is the powder of dried thyroid glands. It is of a grayish-yellow color and has a peculiar odor.

Therapeutic Applications.—This remedy is claimed to act well not only in the treatment of myxœdema, but also in syphilis, obesity, and in various diseases of the skin, especially psoriasis, lupus, and ichthyosis.

Administration.—Thyroidin is given internally in the form of pills or pastilles, in daily doses of from 1½ to 4½ grains (0.10 to 0.30 gramme), which doses may be increased gradually. Large initial doses should be avoided, for untoward symptoms have been observed under the action of thyroidin, such as anorexia, vertigo, a rapid pulse, and cardiac palpitations.

TOLYPYRIN.

This new antipyretic is prepared from paratoluidin, this being first converted into para-tolylhydrazin. The latter body is then treated like phenylhydrazin in the preparation of antipyrin. *Tolypyrin* may be represented by the formula

$$C_6H_4CH_3\begin{cases} CO.CH. \\ CH_3N.CH_3C. \end{cases}$$

Physical Properties.—This drug occurs in colorless crystals with a bitter taste and having a melting-point of from 276.8° to 278.6° F. (136° to 137° C.). With perchloride of iron an aqueous solution of tolypyrin gives an intense red coloration which turns green on the addition of nitric acid. Heated with nitric acid of the strength of twenty-five per cent., it gives a reddish coloration which changes to a clear yellow on the addition of ammonia.

Solubility.—Tolypyrin is readily soluble in alcohol, and in water in six times its own weight; it is almost insoluble in ether.

Physiological Action.—In the lower animals toly-

pyrin produces no marked action. In rabbits 75 grains (5 grammes) of the drug per day have caused no deleterious effects. The drug is eliminated by the urine.

Therapeutic Applications.—This recent medicament has been employed mainly as an antipyretic in febrile disorders, such as pneumonia, typhoid fever, scarlatina, erysipelas, phthisis, etc., with results superior to those obtained from the use of antipyrin. This remedy has not caused any untoward after-effects. It has, however, been found less powerful than antipyrin in the treatment of rheumatic affections, but it has rendered marked service as an antineuralgic and analgesic in such diseases as sciatica, cephalalgia, etc.

Administration.—Tolypyrin can be given in single doses of 15 grains (1 gramme), in capsules.

TOLYSAL.

To the *salicylate of tolypyrin* the name of *tolysal* has been given. It has the following chemical composition: $C_{12}H_{14}N_2O.C_7H_6O_3$.

Physical Properties.—This new salt occurs in small, almost colorless crystals having a bitter taste and melting at from 213.8° to 214.6° F. (101° to 102° C.).

Solubility.—Tolysal is soluble in alcohol and in acetic ether, slightly soluble in water, but insoluble in sulphuric ether.

Physiological Action.—Like tolypyrin, tolysal is non-poisonous. Daily amounts of 45 grains (3 grammes) administered to rabbits have produced no bad effects. It has no cumulative action, and causes no secondary disagreeable effects.

Therapeutic Applications.—This medicament has been found useful in acute, subacute, and chronic rheumatic troubles, in neuralgias, and in nasal, pharyngeal, and laryngeal catarrh. It is said to possess marked antipyretic powers, and to have produced excellent results in continued fevers, diphtheria, pneumonia, and pulmonary phthisis. This salt is also alleged to possess

antifermentative and antiseptic properties. As an antineuralgic it has proved superior to phenacetin and other similar remedies.

Administration. — Tolysal can be administered in single doses of 15 grains (1 gramme) according to indications. It may be given in capsules.

TRICHLORACETIC ACID.

($C_2Cl_3O.OH$.)

Therapeutic Applications.—This substance has recently been introduced as an escharotic in venereal and cutaneous affections, and as such it has given good results. It is said to be of value as an astringent when applied to suppurating surfaces and sinuses.

Administration.—This acid is locally applied.

TRICRESOL.

To a mixture of meta-, para-, and ortho-cresols, as obtained from coal-tar, the name of *tricresol* has been applied.

Physical Properties.—This medicament occurs in the form of a colorless liquid having an agreeable cresol-like odor. It has a sp. gr. varying from 1042 to 1049, and a melting-point of from 365° to 401° F. (185° to 205° C.).

Solubility.—Tricresol is soluble in cold water in the proportion of 2.5 per cent.

Therapeutic Applications.—This remedy is recommended as a valuable disinfectant in surgical practice. It has been employed internally, with alleged good results, as an intestinal antiseptic in typhoid fever and dysentery. The drug has been suggested as a solvent for the preparation of collyria.

Administration.—For surgical purposes aqueous solutions varying from ½ to 1 per cent. are recommended, the latter strength being said to equal that of a 3 per cent. solution of carbolic acid. Internally, tricresol may be given in capsules, dissolved in olive oil, in single doses

of 1½ grains (0.10 gramme), preferably after meals, three or more times a day, according to indications. As a solvent for collyria tricresol-water of the strength of 1 to 1000 may be used.[1]

TRIMETHYLAMIN.

This body is an ammoniacal base found in cod-liver oil and in ergot and other plants. It is commonly called *secalin*, and is represented by the formula $N(CH_3)_3$.

Physical Properties.—This drug is a gas at ordinary temperatures, but below these it becomes a liquid. It has an odor resembling that of ammonia or of putrid fish; its reaction is decidedly alkaline. This agent appears in the market in the form of a solution.

Physiological Action.—Trimethylamin increases both the amount and the alkalinity of the saliva. A similar action is exercised by the drug on the nasal and lachrymal secretions. Locally, trimethylamin is a powerful irritant, causing ulcers difficult to heal. This drug increases the pulse-rate when given in comparatively large doses; it also lowers the bodily temperature, but this effect is not constant.

Therapeutic Applications.—Trimethylamin is credited with antirheumatic properties. It has been tried with asserted good results in rheumatic disorders.

Administration.—The dose of this remedy is put down as from 20 to 40 minims (1.25 to 2.50 grammes).

Toxicology.—Under the full influence of trimethylamin albuminuria is produced, this disappearing when the drug is withheld.

TRIONAL.

The term *trional* is applied to the *diethylsulphonmethyl-ethyl methane*, which, like tetronal, is a derivative

[1] *Tricresolamine* is a solution composed of 2 per cent. each of tricresol and ethylenediamine, and claimed to be stronger and less irritant than the tricresol. Tricresolamine is soluble in water, turning yellow on exposure.

of sulphonal. The chemical composition of trional is represented as $C_2H_5CH_3C(SO_2C_2H_5)_2$.

Physical Properties.—This drug crystallizes in brilliant scales having a somewhat bitter taste; it melts at 168.5° F. (76° C.).

Solubility.—Trional is readily soluble in alcohol and in ether; in water it is soluble only in the proportion of 1 to 320 parts.

Therapeutic Applications.—This medicament has mainly been employed as a hypnotic in nervous disorders, especially in the insomnia of the insane. Its action resembles that of the allied compound tetronal. Of late trional has been used with asserted good results in the night-sweats of phthisis. The fact that night-sweats and insomnia frequently occur together makes the medicament still more valuable in the first-named condition.

Administration.—The dose of trional is from 10 to 20 grains (0.6 to 1.3 grammes), and even as high as 60 grains (4 grammes) may be given. The antihydrotic dose is set down as 7½ grains (0.50 gramme).

Toxicology.—The bad after-effects that have been observed under the full influence of trional are the same as, or similar to, those produced by sulphonal (*q. v.*).

TROPACOCAINE.

This alkaloid, or *benzoyl-pseudo-tropeine*, is obtained from the leaves of the small-leaved coca, growing in Java. It has been prepared synthetically also, and its chemical identity with the *pseudo-tropeine* of hyoscyamus appears to have been established.

Solubility.—This drug is soluble in water.

Physiological Action.—Though no special studies regarding its physiological action have been made, clinical observations have shown that small doses hypodermatically injected increase the pulse without affecting the arterial pressure, and cause a slight dryness of the

throat. No effect on the pupil or on the respiration has been noticed.

Therapeutics.—This drug is claimed to be a local anæsthetic and to possess advantages over cocaine. It can therefore be employed as a substitute for the latter remedy.

Administration.—As a local anæsthetic tropacocaine may be employed hypodermatically from a solution of the strength of about 2 grains in 1 drachm of distilled water (0.10 in 2.50 grammes). The dose of this solution may be put down as 10 drops, which is equivalent to about 25 milligrammes of the drug.

Toxicology.—Large amounts of tropacocaine are apt to produce a diminished pulse-rate, vertigo, and intense precordial anxiety.

TUBERCULIN.

An extract, also known by the name of "Koch's lymph" (from its discoverer), obtained by means of glycerin from pure cultures of the tubercle bacillus. Its true chemical nature has not yet been determined definitely.

Physical Properties.—This extract occurs as a transparent liquid of a yellowish color, and apparently only stable in concentrated solution.

Therapeutic Applications.—This remedy has been employed in the treatment of tubercular disease in general, and especially in bone tuberculosis, but with varying success. It has given the best results, so far, as a diagnostic agent for the tuberculous diathesis.

Administration.—The initial dose of *tuberculin* is put down as from $\frac{1}{200}$ to $\frac{1}{180}$ of a grain (0.0003 to 0.0005 gramme) hypodermatically injected, the amount being increased gradually and carefully.[1]

[1] *Tuberculocidin* or *tuberculocidin* is an albumose isolated from crude tuberculin, and is said to act specifically upon the tubercle bacillus without producing febrile symptoms or tissue-necrosis. This agent is still under consideration; so far, it has been found to be superior to the original lymph.

TUMENOL.

By this name is designated a sulphonated preparation of hydrocarbons, allied to thiol, obtained from mineral oils by the action of fuming or concentrated sulphuric acid.

Physical Properties.—*Tumenol* appears in the form of a dark-brown or blackish-brown liquid of a syrupy consistency. The preparation known as *tumenol sulphonic acid* is a dark powder having a peculiar bitter taste.

Therapeutic Applications.—Tumenol is valuable in skin affections, such as eczema, impetigo, prurigo, pruritus, etc.

Administration.—Locally, it is applied in the strength of 5 to 10 per cent. in solutions in ether, rectified spirit, or glycerin. The *tumenol sulphonic acid* is applied as a dusting-powder or in solutions of the strength of from 2 to 5 per cent.

URALIUM.

This drug, also known as *ural* or *chloral-urethane*, is, as the latter name indicates, a compound of chloral and urethane obtained by treating a combination of these drugs with concentrated hydrochloric and sulphuric acids. It has not been determined fully whether this is a definite chemical compound or a mere mixture.

Physical Properties.—Ural occurs as a crystalline body having a melting-point of 217.4° F. (103° C.).

Solubility.—This drug is freely soluble in alcohol and in ether; it is insoluble in cold water.

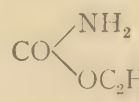
Therapeutic Applications. — *Chloral urethane* has been highly recommended as a hypnotic, and in this respect is alleged to be superior to chloral.

Administration.—This remedy may be given in doses of from 15 to 45 grains (1 to 3 grammes).

URETHANE.

A carbonate of ethylic ether, also called *ethyl carbamate* or *ethyl urethane*, obtained by the interaction of

nitrate of urea and ethylic alcohol at a temperature of from 248° to 269° F. (120° to 130° C.). Its formula is



Physical Properties.—This substance occurs in crystalline odorless masses having a taste resembling that of saltpetre. It melts at from 116.6° to 122° F. (47° to 50° C.), and its boiling-point varies from 338° to 356° F. (170° to 180° C.).

Solubility.—Urethane is soluble in 1 part each of water and ether, $\frac{6}{10}$ of alcohol, $1\frac{3}{10}$ of chloroform, and $\frac{3}{10}$ of glycerin.

Physiological Action.—This drug causes at first a short period of excitement, accompanied with increased pulse-rate and respiratory movements. It acts chiefly as a depressant to the cerebral psycho-motor centres, causing at the same time a diminution of the reflexes through a spinal influence. This drug is also said to diminish the irritability of the peripheral ends of the motor nerves. Even in full doses it is not so depressant to the circulation as is chloral. In toxic amounts urethane causes a decided fall of the bodily temperature. Death under urethane occurs from asphyxia.

Therapeutic Applications. — Ethylic urethane has been lauded as a sedative and hypnotic. It has apparently done good in the treatment of mental diseases, and particularly in nervous disorders of children, such as tetanus. It has been found of marked service in puerperal eclampsia. This remedy is alleged to possess antidotal powers against convulsant poisons, but at present its chief use is as a hypnotic.

Administration.—The dose of urethane is from 15 to 45 grains (1 to 3 grammes), and even as high as 60 grains (4 grammes) may be given. Hypodermatically, it may be administered in amounts of 4 grains (0.25 gramme).

UROPHERIN.

Uropherin, which must *not* be confounded with *euphorin* nor with *europhen*, is the name given to a white powder composed of theobrômin-lithium and lithium salicylate.

Solubility.—This new combination is soluble in water in the proportion of about 1 to 5 parts.

Therapeutic Applications.—Uropherin is said to be absorbed more rapidly than diuretin, and to produce as good diuretic effects as the latter remedy, and in proportionately smaller doses. This recent mixture has given satisfactory results in the treatment of heart diseases with degeneration, as well as in that of acute nephritis. Combined with digitalis, uropherin is said to act more decidedly than when given alone.

Administration.—Uropherin can be prescribed in solutions or alone in capsules, in single doses of 15 grains (1 gramme).

URTICA.

This plant, commonly known as the stinging-nettle, is *Urtica dioica* of the family of the *Urticeæ*. No thorough chemical analysis has been made of it.

Therapeutic Applications.—This drug, recently introduced, is said to be one of the best diuretics known, and is also credited with hæmostatic properties. It has been used with apparent success in the treatment of dropsies and hemorrhages.

Administration.—Urtica is administered in the form of infusion or tincture; locally, as an ointment.

VALERIANIC ETHER.

Ethylic ether of iso-valerianic acid (another name for the above substance) has the chemical composition $C_5H_9O_2.C_2H_5$.

Physical Properties.—*Valerianic ether* appears in the form of a colorless limpid liquid having a valerian-like odor. It has a sp. gr. of 0.871 and a boiling-point of from 271° to 273° F. (133° to 134° C.).

Therapeutic Applications.—This drug has recently been employed with alleged excellent results in the treatment of nervous disorders, such as asthma and other spasmodic affections.

Administration.—Valerianic ether can be prescribed in gelatin capsules, in doses of 2 minims (0.12 gramme) according to indications.

VANILLIN.

A body obtained from the vanilla plant (*Vanilla planifolia*). This principle is said to occur also in many beet-sugars and in the wood of various plants. The composition of vanillin is C_6H_3OH,OCH_3CHO.

Physical Properties.—This drug appears in the form of acicular crystals with an odor and taste resembling those of vanilla, and having a melting-point of 176° F. (80° C.). It boils at a temperature of 545° F. (285° C.).

Solubility.—*Vanillin* is soluble in alcohol, chloroform, and ether, and less soluble in water.

Therapeutic Applications.—This drug is recommended as a stimulant and tonic in the treatment of dyspepsia.

VERNONIA.

This plant is the *Vernonia nigritiana*, said to contain a glucosidal principle termed *vernonin*.

Therapeutic Applications.—This plant is credited with febrifuge properties, but its use in practical medicine has not yet been extensive.

VIBURNUM.

Virbunum prunifolium, the botanical name of this plant, has not been analyzed chemically.

Therapeutic Applications.—*Viburnum* is said to be an excellent uterine sedative. It has been found serviceable in the treatment of dysmenorrhœa, threatened abortion, and allied disorders.

Administration.—A tincture of the drug is given in

doses of from ½ to 1 drachm (1.9 to 3.8 grammes) every four hours.

VIEIRIN.

A principle extracted from the bark of *Remijia vellozii*, a plant belonging to the *Rubiaceæ*.

Physical Properties.—*Vieirin* is an amorphous powder having a bitter taste and an aromatic odor. It melts at a temperature of 248° F. (120° C.).

Solubility.—This drug is freely soluble in alcohol and in chloroform.

Therapeutic Applications.—This remedy is employed as a general tonic, and in the treatment of malarial and other febrile affections as a substitute for quinine.

Administration.—The dose of vieirin varies from 1 to 3 grains (0.06 to 0.18 gramme), repeated during the day as required.

WRIGHTINE.

The bark of the plants known botanically as *Holarrhena antidysenterica* and *Wrightia antidysenterica* contains an alkaloidal principle to which the name of *wrightine* has been given. Its chemical constitution is said to be $C_{24}H_{40}N_2$.

Therapeutic Applications.—To *wrightine* are ascribed properties similar to those of the plants from which it is extracted. It is said, therefore, to be useful in diarrhœa and dysentery, and to possess, besides, anthelmintic and febrifuge powers. This drug has not been studied sufficiently to warrant more definite statements regarding its therapeutic action.

XYLOL.

This substance, also called *xylene* and *dimethyl-benzene*, is a hydrocarbon resembling benzene, and having a formula of C_8H_{10}.

Therapeutic Applications.—This drug is said to possess antiseptic powers, and is employed especially in the treatment of variola.

Administration.—The dose of *xylol* is given as from

30 to 45 grains (2 to 3 grammes), and it is best administered in wine.

ZINC.

Zinc is not, of course, a new remedy. Recent combinations of it, however, are being tried in practical medicine, and the writer has thought proper to remind the reader of the general action and toxic properties of the drug.

Physiological Action.—Almost all the preparations of zinc act as astringents. Taken internally, they act as depressants to the nervous system. Some of them, particularly the chloride and the sulphate, cause, in sufficiently large amounts, violent gastro-intestinal irritation, and, if used for a long time, organic changes in the nervous system, especially transverse myelitis. Zinc is eliminated by the kidneys and the liver.

Toxicology.—The symptoms of acute poisoning by zinc are, as has been intimated, of a gastro-intestinal nature. Chronic zinc-poisoning, though rare, is closely related to chronic lead-poisoning.

The new compounds of zinc are few in number. The most important of these used in practical therapeutics will be described in the following paragraphs.

ZINC MERCURIC-CYANIDE.

A compound, the chemical formula of which is Zn_4-$Hg(CN)_{10}$.

Physical Properties.—This agent occurs as a white powder.

Solubility.—*Zinc mercuric-cyanide* is insoluble in water.

Therapeutic Applications.—The *cyanide of mercury and zinc* has been highly recommended as a non-irritating antiseptic. Its use, however, has not been very extensive.

ZINC SOZOIODOLATE.

Physical Properties.—This compound appears in the form of crystalline needles.

Solubility.—This drug is soluble in water in the proportion of 1 to 20 parts.

Therapeutic Applications.—The *sozoiodolate of zinc* is highly serviceable in the treatment of acute and chronic blennorrhœa, and also in catarrhal inflammation of the mucous membrane of the nose and pharynx.

Administration.—In acute cases of gonorrhœa the *sozoiodolate of zinc* may be employed in from ½ to 1½ per cent. solutions in distilled water, to which may be added 2½ per cent. of laudanum. In chronic cases the laudanum may be substituted by the salicylate of bismuth.

ZINC SULPHYDRATE.

This body has a formula of $Zn(SH)_2$.

Physical Properties.—This medicament occurs as a white solid substance which decomposes in the dry state, and must therefore be kept under water.

Therapeutic Applications.—The *sulphydrate of zinc* has been employed, both internally and externally, with good results in the treatment of chronic eczema, psoriasis, and dermatoses of a vegeto-parasitic nature.

Administration.—This remedy is given internally in doses of from ½ to 2 grains (0.03 to 0.12 gramme) in pill form. Externally, it is applied in the form of an ointment of the strength of 10 per cent.[1]

[1] Among other recent compounds of zinc may be mentioned the *chrysophanate*, a brownish-red powder; the *gynocardate*, a granular yellowish powder, used as a substitute for gynocardic acid in diseases of the skin; and the *permanganate*, a body similar to the potassium salt, said to be useful in all forms of urethritis in aqueous solutions of 1 : 4000. The *chloride of zinc* has of late been claiming the attention of practitioners as a valuable therapeutic agent in the treatment of early pulmonary tuberculosis. Recent researches have shown that hypodermatic injections tend to promote the formation of fibrous tissue, bringing about the desired results. Injections have produced no untoward local or constitutional effects. Zinc chloride is employed from solutions of the strength of from 1 : 50 to 1 : 20. These solutions can be administered hypodermatically in doses of 3 minims (0.18 gramme), this amount being repeated every third or fourth day until five or six injections have been given.

APPENDIX.

ARECOLINE.

This substance is said to be the active principle of areca-nut, or *Areca catechu*. Its composition is represented by the formula $C_8H_{13}NO$.

Physical Properties.—In the pure state this drug appears in the form of a volatile fluid, strongly alkaline and colorless. The *hydrobromate of arecoline* is a crystalline body.

Solubility.—This remedy is soluble in alcohol, ether, chloroform, and water, in all proportions.

Physiological Action.—*Arecoline* is quite poisonous, one of its chief effects being a marked increase of intestinal peristalsis. This remedy acts as a tæniafuge. As a laxative it is said to be as powerful as eserine, and ten times as strong as pilocarpine.

Therapeutic Applications.—Arecoline has so far been used in veterinary practice only.

Administration.—This drug is best administered in the form of the hydrobromate. It is given, for the horse, in single doses of 1¾ grains (0.10 gramme), and for the ox in quantities of 3¾ grains (0.25 gramme).

PSEUDOHYOSCYAMINE.

This new alkaloid has recently been discovered in the *Duboisia myoporoides*. Chemically this alkaloid is represented by the formula $C_{17}H_{23}NO_3$.

Physical Properties.—This drug occurs in the form of small yellow needles having an acrid, bitter taste, and

melting, without decomposing, at from 271.4° to 273.2° F. (133° to 134° C.).

Solubility.—*Pseudohyoscyamine* is readily soluble in alcohol and in chloroform. It is sparingly soluble in ether and in water.

Physiological Action.—Hypodermatically, pseudohyoscyamine causes a burning sensation and intense redness at the point of injection, but these phenomena soon disappear. The general action of this drug is said to be similar to that of atropine or duboisine, but to be weaker and more evanescent. In small doses pseudohyoscyamine slightly stimulates both the circulation and the respiration, these phenomena being accompanied by a moderate dilatation of the pupil. It causes torpor and somnolence, but no sleep. This new remedy therefore seems to be more of a sedative than a hypnotic.

Therapeutic Applications.—This remedy has been employed advantageously in the treatment of mania and hysteria, with results alleged to be superior to those obtained from the use of atropine or duboisine in the same class of cases.

Administration.—Pseudohyoscyamine is better administered hypodermatically in single doses varying from $\frac{1}{120}$ to $\frac{1}{100}$ of a grain (0.0005 to 0.006 gramme).

Arsenite of copper has recently been claimed to be an excellent remedy in the treatment of anæmia and gastro-intestinal disorders. This drug seems also to have acted well as an antispasmodic—as, for instance, in whooping-cough. In all these affections minute quantities should be employed and be watched carefully. The initial dose of copper arsenite may be put down as from $\frac{1}{120}$ to $\frac{1}{1000}$ of a grain (0.0005 to 0.0006 gramme).

Cannabindon, obtained from *Cannabis indica*, occurs as a cherry-red-colored, syrupy substance, soluble in alcohol, ether, chloroform, benzene, and other sub-

stances. The alcohol and ether solutions are said to burn with a strongly sooting flame. Cannabindon is represented by the formula $C_8H_{12}O$. In doses of from ⅓ to 1⅓ grains (0.02 to 0.08 gramme) this drug causes a state of exciting intoxication instead of sleep.

Dermol, analogous to dermatol—said to be a *chrysophanate of bismuth* ($Bi(C_{15}H_9O_5)_2Bi_2O_3$), a yellow amorphous powder, soluble in nitric and sulphuric acids with the production, respectively, of a saffron-yellow and a violet-red solution—and *chroatol,* resulting from the action of iodine upon turpentine, are two new dermic agents that have found favor in cutaneous therapeutics. The clinical data, however, are so far insufficient.

Diabetin (lævulose) has been used in diabetic cases with good results. The dose of this remedy is put down as 1⅝ ounces (50 grammes) a day.

Lactophenin, a derivative of phenacetin, is described as a white insipid powder, soluble in 330 parts of water. This new medicament is reported to have analgesic, hypnotic, and antipyretic properties. It has been employed as a substitute for antipyrin. As an antipyretic lactophenin appears to have rendered good service in the treatment of typhoid fever, producing also, in this disease, a quieting influence on the delirium. The dose of lactophenin is given as from 10 to 15 grains (0.60 to 1 gramme) three times a day.

Naphthol-camphor has been tried with apparently excellent results in the treatment of tubercular adenitis. In cases of this disease subcutaneous injections of the drug are recommended. (See *Naphthol,* p. 138.)

Nuclein is a phosphorated proteid extracted from the spleen and other organs. It occurs in the form of a light-yellow-colored powder, soluble in alkaline solu-

tions, but insoluble in alcohol or in water. In doses of from 30 to 45 grains (2 to 3 grammes), properly diluted, nuclein is said to enhance phagocytosis by increasing the number of white corpuscles. This remedy has been employed hypodermatically, with apparent success, in the treatment of pleurisy and pneumonia.

Orchidin, a substance obtained from testicular fluid, is claimed to act therapeutically like spermine, but appears to be an unstable preparation. Reliable clinical data are still wanting.

Rubidium iodide has lately been proposed as a succedaneum for the potassium salt. The *iodide of rubidium* occurs in odorless white crystals having a taste resembling that of potassium iodide, and is more soluble than the latter remedy. Rubidium iodide can be given internally, in milk, in tablespoonful doses of a 1 : 40 aqueous solution. As a local application in eye affections it can be employed from solutions of the strength of 1 : 20, and in diseases of the skin, in the form of ointment with vaseline, also of the strength of 1 : 20.

Tannigen, or **acetyltannin**, is a compound of acetyl and tannin. This new remedy appears in the form of a yellowish-gray powder, odorless and tasteless, slightly hygroscopic, and melting at 374° F. (190° C.). It is freely soluble in cold alcohol and in dilute solutions of borate, carbonate, and phosphate of sodium. Tannigen has been employed with good results in the treatment of chronic diarrhœas, especially those occurring in phthisical individuals. This remedy is administered internally in doses of from 3 to 7½ grains (0.20 to 0.50 gramme), and even as high as 60 grains (4 grammes) a day. Locally applied in a 3 per cent. solution in 5 per cent. of sodium-phosphate solution, tannigen has rendered good service in the treatment of chronic pharyngitis.

Tussol is the common name applied to the *amygdalate of antipyrin*, which is soluble in water. This remedy is highly recommended in the treatment of whooping-cough of children. Tussol is best given in aqueous solutions with raspberry syrup, in doses of from ¾ of a grain to 6 grains (0.05 to 0.40 gramme), according to the age of the patient. The daily amount for a child one year old is put down as from ¾ of a grain to 1½ grains (0.05 to 0.10 gramme).

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